NUTRITION FOUNDATION OF INDIA

INFANT – FEEDING PRACTICES WITH SPECIAL REFERENCE TO THE USE OF COMMERCIAL INFANT FOODS

By
P. V. Gopujkar, S.N. Chaudhuri, M.A. Ramaswami
M.S. Gore and C. Gopalan

Project funded by UNICEF

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Contents

		Page
Preface		i
Participants in the Study		ii
Acknowledgements		iii
Chapter 1 –	Introduction	1
Chapter 2 –	Design of the Study	4
Chapter 3 –	Population studied	9
Chapter 4 –	Initiation and establishment of breast-feeding	17
Chapter 5 –	Duration of breast-feeding	31
Chapter 6 –	Regional, social, economic and cultural characteristics related to breast-feeding practices	39
Chapter 7 –	Use of foods other than commercial infant foods	51
Chapter 8 –	Use of commercial infant foods	59
Chapter 9 –	Infant-feeding practices in relation to morbidity profile and growth status	79
Chapter 10 –	An Overview	96
Selected bibliography		106
Appendix	Why breast milk is better than formula baby foods by Dr. C. Gopalan	111

List Of Tables, Charts and Abbreviations

Table No.		
3.1	Socio-cultural profiles of the Centres.	11
3.2	Percentage distribution of infants by type of dwelling and number of rooms in different Study Groups.	13
3.3	Percentage distribution of infants by household and per capita income per month in different Study Groups.	14
3.4	Percentage distribution of infants by place of delivery in different Study Groups.	15
4.1	Time of first breast-feed and type of pre-lacteal feed.	18
4.2	Age of infants at starting supplementary food in relation to type of pre-lacteal feed.	22
4.3	Reasons given for not establishing breast-feeding.	23
4.4	Average number of breast-feeds per day.	25
4.5	Distribution of very young infants (0-3 months) according to number of breast-feeds given.	26
4.6	Distribution of older infants (6-12 months) according to number of breast-feeds given.	27
4.7	Special foods for nursing mothers.	28
4.8	Nature of special foods for nursing mothers.	29
5.1	Duration of exclusive breast-feeding of infants aged 10-12 months.	33
5.2	Reasons for prolonged breast-feeding of infants aged 6-12 months.	35
5.3	Reasons for starting supplementary foods for infants of all ages.	36
5.4	Reasons for discontinuation of breast-feeding.	37
5.5	Percentage of infants completely weaned at different ages and at different Centres.	37
5.6	Percentage distribution according to duration of breast-feeding of completely weaned infants.	38
6.1	Feeding status of infants.	40
6.2	Feeding status at interview of infants less than 3 months old in different Study Groups at the three Centres.	41
6.3	Feeding status of infants between 3 to 6 months old at interview in different Study Groups at the three Centres.	42
6.4	Feeding status at interview of infants more than 6 months old in different Study Groups at the three Centres.	43
6.5	Pattern of feeding different milk foods to infants of different age-groups by household income per month at the three Centres.	47
6.6	Advice on infant feeding.	48
7.1	Percentage distribution of infants according to age when they started receiving animal milk.	51
7.2	Yardstick of adequacy of volume per feed.	52
7.3	Use of different foods among infants getting supplementary or substitute foods.	53
7.4	Age at starting different foods.	54
7.5	Age at starting different food items — Bombay.	55
7.6	Age at starting different food items — Calcutta.	56
7.7	Age at starting different food items — Madras.	57
8.1	Socio-economic profile of infants given CM in different Study Groups at the three Centres.	60
8.2	Mode of feeding CM and AM.	65
8.3	Pattern of cleaning bottles.	65
8.4	Pattern of sterilization of bottles.	66
8.5	CM – fed infants by their age at starting.	67
8.6	Duration of use of CM among older infants.	67
8.7	Socio-economic profile of infants given CC in different Study Groups at the three Centres.	69
8.8	Reconstitution of CC feed.	71
8.9	Use of commercial infant foods in different age-groups at the three Centres.	72
8.10	Reasons for use of CM and CC in different Study Groups at the three Centres.	74
8.11	Percentage of infants according to use of commercial infant foods compared to exclusive breast-feeding.	75
8.12	Percentage distribution of infants according to percentage of household income per month spent on commercial foods.	76
8.13	Brand names of commercial infant foods found to be in use in the three Centres.	78
9.1	Percentages of ill boys and girls at three Centres during the reference period.	79
9.2	Proportion of ill infants in different age-sex groups.	80
9.3	Classification of illnesses reported by mothers.	81
9.4	Type of illness among infants of different age-groups.	82
9.5	Gastro-intestinal diseases and overall morbidity in infants in relation to different feeding patterns.	83
9.6	Gastro-intestinal diseases and overall morbidity in infants of different age in relation to different feeding patterns.	84

Table No.

9.7	Classification of growth retardation.	85
9.8	Percentage distribution of boys and girls in different age-groups according to Harvard scale percentiles.	86
9.9	Growth status (Gomez's standards) of boys and girls in different age-groups.	87
9.10	Growth status (Gomez's standards) of infants by household income.	89
9.11	Growth status (Gomez's standards) of infants in relation to feeding practice at interview.	91
9.12	Growth status (Gomez's standards) of CM-fed and exclusively breast-fed infants at the three Centres.	92
9.13	Growth status (Gomez's standards) of CM-fed and exclusively breast-fed infants in different socio-economic groups at the three Centres.	93
9.14	Growth status of exclusively breast-fed infants.	94
9.15	Prevalence of severe malnutrition among exclusively breast-fed and CM-fed infants in poor income-groups.	95

Chart No.

4.1	Infants in different Study Groups by time of initiation of breast-feed	19
4.2	Time of initiation of breast-feed and place of delivery.	20
5.1	Percentage of (a) breast-fed and (b) exclusively breast-fed infants at different ages.	32
5.2	Feeding status of infants of 6-12 months.	34
8.1	Advice and use of CM at the three Centres.	63
8.2	Advice and use of CC at the three Centres.	70

Abbreviations

AM	Animal milk exclusively
B	Breast milk exclusively
BS	Breast-fed and given supplementary food from the beginning
C	Cereals other than commercial cereal food
CC	Commercial cereal food (Cereal infant foods) (Baby foods)
CM	Commercial milk food (Formula milk preparation for feeding infants) (Baby foods)
NA	Not applicable
NB	Never breast-fed
NR	Not recorded
R	Rural
SC	Scheduled Castes
SG	Study Group
ST	Scheduled Tribes
SU	Semi-urban
T1	Town 1
T2	Town 2
W	Completely weaned. Only substitute food is given.

Preface

This Study on Infant-feeding Practices was carried out by the Nutrition Foundation of India in the States of Maharashtra, West Bengal and Tamil Nadu with the collaboration and active participation of the heads and staff of three institutions in the country — the Tata Institute of Social Sciences, Bombay; the Child-in-Need Institute, Calcutta and the M.A.C. Institute of Community Health, Madras. The Project was funded by UNICEF (South Central Asia Regional Office).

While the effects of infant-feeding practices are reflected in the health and nutritional status of infants, the determinants of these practices are largely socio-cultural and economic. The Foundation, therefore, recognised from the very start the need for an inter-disciplinary approach to the investigation, and was fortunate to be able to forge a competent inter-disciplinary team of participants belonging to social and medical sciences.

A multi-centric study of the nature carried out here also calls for an effective mechanism for coordination and monitoring. The Foundation was able to ensure these requirements through designating a competent Project Coordinator and the setting up of a Task Force which included, besides the authors, other experts of considerable standing and experience. The organisation, conduct and management of the Study was, by itself, a rewarding learning experience not only for the Foundation but for all participants.

This Report does not do full justice to the massive data collected in the course of the Study. Only the major findings of practical importance from the operational point of view are presented. We did not wish to clutter up this Report with far too many details. Papers bearing on aspects of the Study not adequately covered in this Report will be published separately in due course by the different authors.

This Study does not cover the entire country but only some regions thereof; even so, at least some of the messages generated here may be of relevance to other parts of the country as well. It is hoped that the results of this Study will be useful in some measure to all those interested in the promotion of wholesome infant-feeding practices especially among our poor communities. Such promotion cannot be achieved by the mere drawing up of "Codes"; it will need concrete supportive action. The Foundation hopes that this Report will stimulate such action.

C Gopalan
President, Nutrition Foundation of India

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In the Field

Scores of Field Investigators

Several thousands of families at the three Centres.

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A seed-grant generously provided by the World Council of Churches, Geneva, thanks to the efforts of Dr. Eric Ram, enabled the Foundation to do the preparatory spade work involved in identifying and contacting potential participants, visits to potential project sites and building the infrastructure to equip the Foundation to undertake the project. We gratefully acknowledge this support which was generously extended to us at a time when UNICEF support for the main project had not materialised.

We thank the participating institutions, their heads and staff and the actual participants in the Study. We are grateful to Prof. M.S. Gore for the leadership he provided as Chairman of the Task Force. The Foundation owes a great deal to Prof. T.J. Ramaiah for the unstinted support and important contribution that he made towards ensuring the success of this Study. Prof. Ramaiah was requested to join the Task Force at a time when he had not joined the staff of WHO. We appreciate the important role that the Project Coordinator, Ms. P. Gopujkar had played, and the diligence and dedication with which she applied herself to her assignment. We are also grateful to Ms. Mandakini Khandekar and Dr. Bhavani Belavady, Consultants, for their valuable contributions. I am personally thankful to Mr. T.K. Parthasarathy, Editor (Publications) of the Foundation and Mr. A.S. Prabhakar, Scientific Programme Coordinator of the Foundation, for their valuable help.

To the many field workers in the three Centres employed by the Foundation, who carried out their assignments with meticulous care, we offer our grateful thanks. Most importantly, we thank the several hundreds of families in all Study Centres belonging to diverse communities who cooperated with us most cheerfully and patiently in our field studies.

C. Gopalan
President, Nutrition Foundation of India

Chapter 1

Introduction

The importance of the subject of infant-feeding hardly needs emphasis. It is a subject which concerns not just the 25 to 30 million babies that will be born annually in our country in the next decade, and the several millions of mothers who will be rearing them. In the ultimate analysis, it is very much a subject which deeply concerns the very "quality" of the most precious of all our national assets — our Human Resources. The health and nutritional status of millions of infants, and the 'start' which will influence their subsequent growth and development through childhood will be determined by the pattern of feeding during their infancy.

The subject has acquired added urgency and relevance in recent times. The average infant mortality rate (IMR) in the country as a whole, today stands at over 120 per thousand live births and has remained more or less stationary around this figure for nearly a decade. We have obviously a long way to go before we can achieve an average IMR of less than 50 — the target envisaged in the goal "Health for All by 2000 A.D.", to which we have officially subscribed.

Our family planning programmes, apart from marginal success, have generally failed to make the significant and substantial dent on our population growth, which we are desperately looking for. Our current inability to provide reasonable assurance of survival of children, especially among our poor communities, has not only denied our family planning programmes the benefit of a valuable incentive; but, indeed, it has also served to undermine the very moral and ethical basis of these programmes as far as poor communities are concerned.

The prevention of undernutrition and diarrhoeal episodes, the major factors underlying the current high IMR, would greatly depend on the successful promotion of wholesome and hygienic infant-feeding practices.

There are new pressures on traditional infant-feeding practices which should also occasion concern. The process of "development" inevitably unleashes forces which may affect infant-feeding practices. Urbanisation, industrialisation, the bridging of the 'communication-gap' between the city and the village, increasing employment opportunities for women, and such other factors incidental to "development", are bound to exert their impact on life styles, work-pattern, family structures and value systems in our communities, not only in the urban areas but in the vast rural country-side as well; and these, in turn, cannot fail to influence infant-feeding practices. Frequent monitoring of changing trends in infant-feeding practices is, therefore, necessary in societies in a highly dynamic state of 'development'

Till almost 60 years ago, in all countries of the world infants were invariably breast-fed; 'substitutes' for breast milk were unknown. During the last five decades, however, the practice of bottle-feeding of infants with milk formulas (baby foods) had rapidly spread in the technologically developed countries. It should not be surprising if this trend increasingly becomes part of the "development process" of poor developing countries as well. Recent researches have revealed the unique properties of breast milk as the ideal and inimitable food for the infant; as a result, it is now clear that all the modern technological ingenuity has not

succeeded in producing a *true substitute* for breast milk. With this recognition, active movements for promotion of breast-feeding have started in the developed countries, already with significant success. In this process, the fear has been voiced that developing countries could become the happy hunting ground for enterprising multi-national "baby food" manufacturers, who are now being progressively denied an expanding market for their products in the developed countries.

Extensive studies carried out in India, nearly two decades ago, notably at the National Institute of Nutrition, Hyderabad, had shown that breast milk was the sheet-anchor of infant nutrition, especially among our poor communities. The remarkable 'feat' of Indian women of poor communities, weighing less than 40 kgs, subsisting on diets providing less than 2000 K cal and 40 g protein, putting forth 400-600 ml. of breast milk of good protein concentration, for several months on end, has been well documented in the studies carried out at the National Institute of Nutrition. In the context of poverty and insanitary environment, the problem of undernutrition in infants and children in these poor communities would have been far worse but for this most valuable 'gift' of their mothers. On the basis of these earlier studies, it may be computed that the substitution of breast milk for infant-feeding by equivalent quantities of even animal milk would cost the poor families a minimum of Rs. 100/- per mensem per infant, at the prevailing prices; substitution by commercial infant foods would cost even more. More important than the economic implications of such substitution would be the 'health implications' — the greatly increased risks to the infant of infections arising from unclean bottles and unsafe water.

The progressive substitution of breast milk by commercial infant foods in the technologically developed countries during the last five decades, had not produced any dramatic catastrophic results, because of the vast superiority of their economic status and environmental sanitation. In developing countries like India, however, such substitution at the present state of economy, environmental hygiene and health services, could prove truly catastrophic. At the present time, when even developed countries, not beset with serious economic and environmental sanitation problems, are actively promoting movements for return to traditional breast-feeding, it will be unfortunate if countries like India fail to take adequate steps to check trends in the opposite direction.

National and international agencies have voiced concern over the possible erosion of the salutary traditional practice of breast-feeding. An International Code for the regulation of the marketing and sales-promotion of commercial infant foods has been drawn up. A similar Code, with some modifications has been adopted in India also.

Unfortunately, however, while a great deal of concern and excitement has been generated over the question of "breast versus the bottle", authentic recent data which will enable us to see the whole problem in full perspective and provide the basis for action in this area, are scanty. The important questions that need to be addressed are: "Has there been any serious decline in traditional breast-feeding practices in different communities in the different regions of India? If so, how serious are these erosions? In particular, who are the people using commercial infant foods, why are they using, how, and with what result?

A comprehensive inter-country study on "Contemporary Patterns of Breast-feeding" organised by WHO had addressed some of these and other questions. Studies in India, carried out as part of this project, which generated a lot of valuable information, were again largely confined to the region in and around Hyderabad in Andhra Pradesh.

It must also be remembered that there are more facets to the problem of infant-feeding than the question of the use of commercial infant foods. In fact, it is the threat of possible expanding use of commercial infant foods, that has served to focus attention on these other equally important aspects of infant-feeding, such as, the adequacy of breast milk, the duration of breast-feeding, problems of breast-feeding of infants of working women, appropriate supplementation of breast milk, the state of nutrition of nursing mothers, etc. Breast-feed-

ing was, for long, almost taken for granted. To the extent that the commercial infant food controversy has jolted health scientists and policy-makers out of this complacent attitude, it may have indeed rendered a distinct service to the cause of infant feeding.

The present Study, undertaken by the Nutrition Foundation of India, was not confined to an examination of the use of commercial infant foods alone. Obviously, this question had to be examined in the total context of infant-feeding practices in general. This Study was addressed to investigations of the patterns of infant-feeding practices in three different regions of the country and among different communities within each region. It is not claimed that the data obtained are necessarily representative of the entire country but the Study has at least covered some major centres where the impact of 'development' may be expected to be maximal.

Objectives of the Study

The objectives of the present Study were:

1) To survey the current infant-feeding practices in the community with special reference to the use of commercial infant foods, especially those that are promoted as substitutes for breast milk in different segments of the population and in different parts of the country.

2) To obtain qualitative data on the type of food, including milk other than breast milk, used for feeding infants under 12 months of age, and the reasons why such foods are used or are *not* used.

3) To study the manner and mode of use of different foods including breast milk.

4) To obtain information on some health indicators of the infants associated with these practices.

Organisation of the Study

This was a multi-centric and inter-disciplinary Study. The organisational pattern was such that though the studies were carried out in three different widely separated areas of the country, the investigations were well coordinated and monitored. The investigations were done in the States of Maharashtra (Bombay), West Bengal (Calcutta) and Tamil Nadu (Madras) by an inter-disciplinary team of social and medical scientists.

The Task Force set up by the Foundation not only helped in the formulation of the initial study design but also in monitoring the progress of the Study.

In order to ensure effective coordination of the progress of the studies in the three Centres, Ms. Pratibha Gopujkar, one of the authors of this Report, was designated Project Coordinator, and was vested with the responsibility for organising the final collation, compilation, analysis and tabulation of the data. In carrying out her difficult assignment, Ms. Gopujkar was in continuous and constant contact with the Foundation.

Chapter 2

The Design of the Study

It has been always generally believed that breast-feeding is the traditional and near-universal infant-feeding practice in our country; several small-scale studies carried out in different regions of the country in the past had also tended to confirm that breast-feeding was the overwhelmingly prevalent infant-feeding practice. As was pointed out earlier, a major objective of the present Study was to investigate how this traditional practice was being influenced (if at all) under the impact of social, economic and cultural pressures, changing mores, life styles, and value systems generated by 'modern' development.

These pressures may be expected to operate in their maximum intensity in the major metropolitan cities of the country, and to radiate centrifugally therefrom to semi-urban and rural areas. Smaller towns may also experience these 'pressures' though they may not currently be subject to the influences that characterise ' metropolitan city culture' to the same extent. If 'pressures' generated by 'development' exert deleterious effects with respect to infant-feeding practices not only on the urban population but also on the rural population, it is to be expected that these effects on rural population will be most evident in those rural areas in the immediate vicinity of the big cities, rather than in the remote rural parts far removed from the cities. Also the impact of 'pressures' of development may be expected to vary depending on the deeply ingrained traditions and attitudes of the people and, therefore, may not always be the same for all metropolitan cities and their environs in different regions of the country with widely different cultural profiles. The choice of centres for the Study was based on these considerations.

The Study was carried out in three centres — Bombay, Calcutta and Madras. Originally, a fourth centre in the north of the country, preferably around Delhi, was also envisaged but unfortunately this proposal had to be given up because of operational reasons. Bombay, Calcutta and Madras are the three most populous major cities located in the western, eastern and southern parts of the country. We do realise that observations in the Study pertaining to these centres may not be claimed to provide the total picture of the country; but they can certainly provide data with regard to a a considerable part of the country.

In each of these Centres, the following four Study Groups were chosen :-

1. The Metropolitan City.

2. Peri-metropolitan area within a zone between five and 15 Kms of the city limits.

3. Town 1 (50,000 - 99,999 Population size)

4. Town 2 (20,000 - 49,999 Population size)

The criteria for the selection of the towns (3 and 4 above) were as follows:-

(i) The town should be of specified population. Thus, Town 1 will have population of 50,000 to 99,999, and Town 2 will have population 20,000 to 49,999.

(ii) Both the towns should be at least 50 Kms. away from the metropolitan city but on satisfying this criterion, be the nearest ones to the respective city.

(iii) The distance between the two towns should be at least 50 Kms.

(iv) None of the towns should be atypical, i.e. a port town, hill resort, place of pilgrimage, a sub-urban area, etc.

The demarcation of the peri-metropolitan area was a complex task. The idea of locating a geographical zone surrounding the metropolitan cities and being influenced by the latter was to be put into practice. A belt in the area of 5 - 15 Kms from the city was drawn for this purpose. This peri-metropolitan area included mainly villages and also some small townships. In order to allow for possible variations in trends in infant-feeding practices between them, the small townships were designated as Semi-urban (SU) and the villages as Rural (R).

The selected Study Groups at each Centre are given below:

Table 2.1—The Study Groups In The Sample

Study Groups	Areas selected at		
	Bombay Centre	Calcutta Centre	Madras Centre
City	Greater Bombay	Greater Calcutta	Madras City
Peri-metro-politan area	5 to 15 Kms belt around the above cities		
Town 1	Satara	Midnapore	Tindivanam
Town 2	Sinna	Katwa	Thiruvallur

Type of Sample

The population of all the four Study Groups at each Centre formed the universe for the Study. Based on the earlier studies it was proposed that one per cent sample of the infants in the population would be drawn for each Centre. The infants were assumed to be four per cent of the population.

The sampling design was of a stratified cluster type. The four Study Groups were the strata for each Centre. In order to ensure that the cell frequencies were not too small to facilitate strata-wise analysis, it was decided that the minimum sample size should be 300 at each stratum. It was, therefore, decided to use the following weightage for the sample sizes of the different strata.

Strata	Study Group	Weightage
Stratum I	The City	0.55
Stratum II	Peri-metropolitan area	0.15
Stratum III	Town 1	0.15
Stratum IV	Town 2	0.15

As was mentioned earlier, the peri-metropolitan area comprised mostly villages and small townships. As it was anticipated that the trends in the small townships and the villages may differ, the peri-metropolitan area was divided into "Semi-urban" and "Rural". The following five Study Groups (SG) were entered into the Code book of each Centre; The Metropolitan City; The Semi-urban area (SU); The Rural area (R); Town 1 and Town 2.

Selection Procedure

The sample was selected in two stages. The following steps were used:-

1. The estimated population for 1981 of the Study Groups was obtained from the Census authorities and added up to get the population of the universe at each Centre.

2. The number of infants in the population at each Centre was computed on the basis of an estimate of four per cent. Of these infants, one per cent formed the sample size at each Centre.

3. With the appropriate weightage, the sample size for each stratum or Study Group was computed.

4. It was decided to select the small Census Enumeration Blocks (EB) at the first stage of selection. The size of these EBs was more or less uniform. Each EB had on an average 120 households or a population of 600. Thus at the rate of four per cent, each EB was estimated to have 24 infants. The number of EBs needed to give the estimated sample size for each Study Group was computed and the EBs were selected on a random basis with the help of a table of random numbers.

5. The selected EBs were identified with the help of the Census enumerators and were enumerated again for the Study with a specially devised enumeration form. The mothers with infants were identified at this stage. Attempts were made to interview all such mothers. Thus, the actual sample size was different from the estimated one.

The sample size of infants was estimated on the basis of the assumption that 4% of the population would be infants. However, in actual fact, at every Centre, the proportion of infants in the population turned out to be less than 4%. This created a problem for the Study Groups 2, 3 and 4 from each of which only 15% of the sample was to be drawn. The samples obtained at these Study Groups were less than 300 and did not meet the minimum requirement of size which was to be 300. In order to overcome this deficiency, after analysing data on certain key variables from a Sub-sample at each Centre, it was decided to increase the sample size at the Study Groups where it was less than 300. This meant extended field work, selection of additional blocks and repeated visits to towns for interviews. This was of course possible as at all the Centres certain additional EBs based on random number tables had been selected to be in reserve.

Preparation of Tools

A number of tools were prepared for this Study. The special characteristics of the major tools will be presented here.

The Enumeration Form

Selection of the sample of infants involved the prerequisite of enumerating the selected blocks. The importance of a well-planned recording of this enumeration work was anticipated and a special form was devised for this purpose. Every form carried the identification details such as the title of the Study, the name of the investigator (enumerator), date of visit, Study Group, and the Census Block No. Every enumerated household, the Census Household No., address, number of families residing therein, the name of the head of every family, family size, family with or without an infant and visit number and remarks were recorded. This recording proved to be very useful for interviewing purposes as well as for analysis of the data.

All the Census House Numbers in the Block were recorded on the form. Clear remarks were written for house numbers which could not be found on houses which were used for purposes other than residential. To cover the entire population, the possible existence of sub-tenants, etc., was taken into consideration and the form provided a column for the numbers of residing families. The instructions were to record details for every residing family. The interviewers were instructed to make three visits to a household with an infant before concluding "no response" and also to record reasons for not conducting an interview in case of "no response". This information helped in analysing the reasons for "no response" cases. Clear instructions as to how to record information in the Enumeration Form were circulated among the field staff during their training period.

The Schedule

A fairly detailed schedule was prepared in order to elicit information on a wide range of factors related to infant-feeding practices. The schedules were pre-tested at each Centre and were slightly modified on the basis of the experience in the field. The field-work experience gathered while pre-testing the schedules helped a great deal in preparing instructions for the interviewers.

The interviewers were specially trained in recording age, family relationships, income, occupation and reference to commercial infant foods. Instructions regarding applicability of certain questions in certain situations were provided in the schedule itself.

It was decided to avoid any reference in the Report to brand names of commercial infant foods used. However, since pre-testing experience indicated that using brand names at the time of interview helped in getting clear responses regarding use of commercial milk food, a list of different brands of commercial infant foods was prepared. Code numbers were given to these brand names and the interviewers were made familiar with these Code numbers which they could enter in the schedules. This arrangement was quite successful at all the Centres.

Growth Charts

The actual weight of infants in Kg (correct up to the nearest 200 grams) was recorded in the schedule. For purposes of assessing the growth performance the weight of the infant in relation to its age in completed months was taken into consideration.

In the absence of standards of weight/age for Indian infants (based on extensive data on normal infants whose growth was not subject to socio-economic constraints), it was decided to use the conventional Harvard standards for boys and girls. In the absence of Indian standards based on actual studies on normal infants, the use of these standards was considered justified especially as earlier studies reported from the National Institute of Nutrition, Hyderabad, had indicated that for older Indian children, the Harvard standards were in fact broadly applicable.

We recognise that gradations of growth retardation are necessarily arbitrary; but they serve the practical purpose of providing a broad picture of the extent of growth retardation in different groups. The gradation procedure very widely followed internationally is that of Gomez, according to which children with weight/age up to 90% of the 50th percentile are deemed normal, those with weight/age between 90% and 75% are in Grade 1 of growth-retardation, those with weight/age between 75% to 60% in Grade 2 and those below 60% in Grade 3. The Indian Academy of Paediatrics (IAP) had recommended the cut-off limit of 80% of the 50th percentile as the limit of normalcy, 80% to 70% for Grade 1, 70% to 60% for Grade 2, and below 60% for Grade 3; in addition, a fourth grade comprising children with weight/age less than 50% of the 50th percentile figure was also included. The use of these cut-off points again is wholly arbitrary. The adoption by the IAP of 80% of the 50th percentile as the limit of normalcy may well be a concession to the practical reality that growth-retardation in our children is very widespread. While the Gomez's scale is widely used internationally, the IAP grades are being put to wide use in our Integrated Child Development Service (ICDS) and other programmes. Because of their merits arising from wide usage, we have adopted both these classifications in the presentation of our growth data. We do recognise the limitations of these classifications.

Use of devices: Salter weighing scales, one for weights up to 10 Kgs with reported accuracy up to 100 gms, and another for weights up to 210 Kg with reported accuracy up to 200 gms were used for weight measurements. These scales were found to be accurate even after weighing 400 to 500 infants with each one of them. Infants were weighed with minimal clothes on.

The interviewers were asked to measure all liquids in mls. or ounces and all solids (like milk powders, commercial cereals, etc.) in number of teaspoons. Standard feeding bottles indicating ounces and mls. were purchased and given to the interviewers. They were instructed and supervised for measuring the liquids with the bottle and the powders with teaspoons.

Typed lists of brand names of commercial milk (CM) powders and commercial cereals (CC) were circulated so that the interviewers could identify the CMs and CCs separately. Lists of Block

numbers and their particulars were typed and circulated. Letters introducing the interviewers were also given and copies of letters of permission obtained from the Census Authorities were also distributed. Not to mention the usual accessories like bags, pads and pens, all of which made the interviewing easier.

Some terms used in the Study are explained below:

Infant: An infant is a child from birth to the completion of 12 months of age. Age of infants was recorded in completed months. For example, a four months old child is anywhere between 4.0 to 4.9 months. Assuming that the distribution would be more or less normal, the mid-point 4.5 was used to assess their growth status. The infants included in this Study were also termed as 'index children' to separate them from other infants in the house.

Status of breast-feeding: The process of breast-feeding has a time dimension. The establishment of breast-feeding needs a certain time and even the weaning is a slow process. Many points such as when breast-feeding was started, how long it was continued, when the first supplement (either milk or other food) was introduced and when breast-feeding was stopped, all become important in this connection.

A child was considered to be breast-fed only if breast-feeding was continued beyond 20 days of age. That ensured about 15 days of breast-feeding leaving the maximum period of five days to start breast-feeding. All those children in whose case breast-feeding was stopped before 20 days of age were considered as 'never-breast-fed'.

Income: The household income per month was available in the schedule. The number of household members was also recorded. Computing actual per capita income was thus possible. Income was then recorded in two ways, first the total household income p.m. and then the per capita income p.m. computed from the actual household income.

Per capita income categories had intervals of Rs. 25. Even this grouping was arbitrary but one of the categories included the per capita income values used to demarcate poverty line. The Sixth Five Year Plan (India, 1981) gives the per capita income per month to define poverty line at the 1979-80 prices to be Rs. 76 in rural areas and Rs. 88 in urban areas. Both these are covered in the interval Rs. 76-100 which is used in the present Study.

Family type: Households or families were classified on the basis of these details by using the following descriptions for the different types:

Nuclear family: It consists of the basic biological unit i.e. the husband, wife and unmarried children or a part of this unit.

Extended family: A family having one nuclear unit and some additional members who do not form another nucleus is an extended family.

Joint family: Two or more nuclear units staying together with or without any other members form a joint family.

Supplementary food refers to all foods given *in addition* to breast milk.

Substitute food refers to all foods given to infants *not receiving breast milk*.

Chapter 3

The Population Studied

The three Centres selected for this Study belonged to three different States. Some relevant macro-level background information on population and socio-economic aspects in these three Centres is presented here.

The macro-level picture

Population characteristics: Maharashtra, where the Bombay Centre is located, is more populous than both West Bengal and Tamil Nadu (where the Calcutta and Madras Centres are located) in terms of the actual population size. Moreover, the last decadal growth rate of the population was also higher for Maharashtra than for West Bengal or Tamil Nadu. Density-wise, however, the States in the order of high-to-low density are West Bengal, Tamil Nadu and Maharashtra.

In 1981, a higher percentage of population lived in urban areas in Maharashtra (35), than in Tamil Nadu (33) and in West Bengal (26). The sex-ratio was much higher in Tamil Nadu (978) than in Maharashtra (938) and in West Bengal (911). Another indicator giving some idea of the social situation is the percentage of population of Scheduled Castes (SC) and Tribes (ST) to the total population. This indicator gives an idea of the proportion of traditionally neglected sections of population. The percentages of SC and ST population in the three States were 20.4 for Maharashtra 26.2 for West Bengal and 18.9 for Tamil Nadu.

Economic characteristics

The average landholding per cultivator (net sown area in hectares) was 2.8 in Maharashtra, 1.6 in West Bengal and 1.3 in Tamil Nadu in 1975-76. The same ranking was seen when average per capita foodgrain production was taken into consideration. The percentage of population engaged in agricultural work was higher in Maharashtra than in Tamil Nadu or West Bengal.

The employment situation was comparable in Maharashtra and Tamil Nadu but was very poor in West Bengal where work-participation rate was 28.47, lower than the all-India average (33.44). With respect to proportions of population employed in industrial occupations, Maharashtra was first, West Bengal second and Tamil Nadu the third. With respect to per capita income, Maharashtra was first, Tamil Nadu second and West Bengal the third.

In all the three selected States, about 56%-59% of the rural population were below poverty line as against 51% for the country as a whole. The percentages of urban population below poverty line were Maharashtra (32), West Bengal (35), and Tamil Nadu (45), the corresponding all-India figure being 38%.

Developmental indicators

The literacy rate was slightly higher in Maharashtra (47.0) than in Tamil Nadu (45.8) or

West Bengal (40.9). A similar situation is indicated by the number of students in primary and secondary schools per 1,000 population (as on 30-9-1979) which was more in Maharashtra than in Tamil Nadu or West Bengal. On this point, the situation in West Bengal was worse than that indicated by the all-India average. The communication facility in terms of road length per 100 sq.km. of area was better in West Bengal than in Tamil Nadu or Maharashtra. The domestic consumption of electricity per capita (kwh) for 1980-81 was more in Maharashtra than in the other two States.

Compared to Maharashtra, Tamil Nadu had lower birth rates and higher death rates in both rural and urban areas. The IMR in the rural areas of Tamil Nadu was higher than that in rural Maharashtra but IMR in urban Tamil Nadu was slightly lower than that in urban Maharashtra. West Bengal had higher birth rates both in rural and urban areas. Its death rate in rural areas too was higher, but that in urban areas was lower.

On most of these indicators, all the three States seemed to be in a better situation as compared to all-India averages. Each of these States has a metropolitan city whose characteristics strongly influence the State averages and so in terms of development and socio-economic situation, the State averages turn out to be better than the all-India averages.

Characteristics of the samples

The secondary data presented earlier provides only a macro-level view of the situation prevailing in the three States where the Centres for the Study were located. However, this view is adequate only to meet the purpose of broadly differentiating between the overall socio-economic situations there. A great deal of information about the infants and their families in our Study was collected in specific Study Groups. The characteristics of the actual samples studied in each Centre are presented in Table 3.1.

Religion and caste

An expected characteristic of the samples at all the three Centres was that Hindus were in a majority everywhere: their percentages were 83 at Madras, 74 at Calcutta and 71 at Bombay. The only other religious group with a substantial strength in the sample at Calcutta was Islamic and 24% infants belonged to it. In Madras, Muslims accounted for 9.7% and Christians 6.6%. Bombay was quite varied with Jains and Buddhists in large numbers. Infants from backward castes, scheduled castes and tribes were 32%, 29% and 12% respectively in Bombay, Madras and Calcutta.

Mother-tongue

The major languages at the three Centres were: Marathi at Bombay (58%), Bengali at Calcutta (73%), and Tamil at Madras (77%). Apart from these, other languages applicable in the case of at least two per cent infants in the sample were Urdu, Hindi, Gujarati, Telugu and Tamil at Bombay; Urdu and Hindi at Calcutta; and Telugu and Malayalam at Madras.

Type of family

The percentages of infants belonging to nuclear families were 54% at Madras, 53% at Calcutta and 46% at Bombay. More than 50% infants belonged to nuclear families in the peri-metropolitan areas of Calcutta and in all Study Groups of Madras. The situation at Bombay was totally different; comparatively more infants at this Centre were living in extended or joint families. The inflow of migrants not only into Greater Bombay but also into the towns nearby and the housing shortage in the metropolis might have influenced this type of family.

Size of family

Families were also divided by their size into:

i) Small families (1-5 members),

Table 3.1—Socio-cultural profiles of the Centres

Characteristics	Percentage distribution of infants		
	Bombay	Calcutta	Madras
Religion			
Hinduism	70.7	74.5	82.7
Islam	15.8	23.7	9.7
Christianity	3.0	0.2	6.6
Buddhism	6.9	–	–
Jainism	2.7	0.5	0.7
Others	0.6	0.1	0.1
NR	0.3	1.0	0.2
Caste			
Brahmins	7.1	11.0	2.9
Advanced Castes	30.5	48.3	50.9
Backward Castes	19.8	0.3	11.6
Scheduled Castes and Tribes	12.0	12.0	17.4
NA	29.2	24.6	16.9
NR	1.4	3.8	0.3
Mother-tongue			
Marathi	58.3	–	0.1
Bengali	0.4	73.1	–
Tamil	2.1	0.2	77.5
Hindi	8.0	10.1	0.3
Malayalam	12.7	14.4	4.6
Telugu	3.0	0.1	12.4
Gujarati	6.2	0.2	0.6
Others	9.2	1.7	4.5
NR	0.1	0.2	–
Type of family			
Nuclear	45.7	52.7	54.1
Extended	25.2	20.8	23.9
Joint	29.1	26.5	22.0
Size of family			
Small	41.7	43.7	48.7
Medium	42.1	39.7	38.4
Large	16.2	16.6	12.9

NR Not recorded *NA Not applicable*

ii) Medium-sized families (6-9 members), and

iii) Large families (10 or more members).

Madras had high percentage of infants in small nuclear families. At Bombay more infants belonged to large joint families. Higher percentages of infants in the semi-urban areas at all the Centres belonged to small nuclear families. In the rural areas, (except at Calcutta), and in the small towns at all three Centres, more infants belonged to large joint families.

Educational status

A person who had education up to secondary school level was considered to be educated. The proportion of educated adults among all adults (15 years of age or older) in the family was treated as an indicator of the educational status of the family.

More than 50% of infants at all the three Centres belonged to families who did not have a single educated member and, therefore, these families had low educational status. Their percentages were 69 at Calcutta, 57 at Madras and 53 at Bombay.

The Study Groups where a high percentage of infants belonged to "low" educational status families were R (70%) at Bombay; SU (83%), R (83%) and T2 (71%) at Calcutta; and R (84%) at Madras. Only at Bombay, quite a few infants in SU (33%) and T1 (30%) belonged to "high" educational status families (in which more than half or all were educated).

Housing and water supply:

The percentages of infants living in hutments were high at Madras (39) and at Calcutta (26) while the percentage was comparatively low at Bombay (19). (Table 3.2.) However the percentage of infants living in one-room dwellings was considerably higher at Bombay (52) than at Calcutta (36) and at Madras (35).

At Bombay, a majority of infants' families were getting piped water supply, the rural area being the exception. Piped water supply was available to about 52%-53% of the infants at Calcutta and Madras. At Calcutta an additional 43% infants' families had access to water from tube-wells while this was so in the case of only 18 per cent infants at Madras. By and large, the first two sources serve two different groups of people and it is possible to add up the percentages for them in order to have a rough idea of the proportion of those with access to safe water. It is seen that Madras fared poorly as about 27% infants' families were without safe water.

The Study Groups where more than 20% infants did not receive safe water supply were R(Bombay)—56%; T1(Calcutta)—22%; and SU, R and T1 (Madras)—73%, 63% and 63% respectively.

Parents' occupational status

More than 60% infants belonged to "single worker families" at Calcutta and Madras. The situation was much different at Bombay; almost equal percentages of infants were in one-worker and two-or-three-worker families. Only one to two per cent of all infants belonged to "no-worker" families.

The fathers of about 95% infants at all the three Centres were working. Those of 17 infants at Bombay, 20 at Calcutta and 11 at Madras were seeking work. Those of 13 infants at Bombay, 12 at Calcutta and 29 at Madras were not working for reasons such as retirement, disability, etc. Not all mothers were working. Only 334 or 18.4 per cent at Bombay, 60 or 4.4 per cent at Calcutta and 92 or 5.3 per cent at Madras were working.

The work participation of mothers in Bombay

Table 3.2—Percentage distribution of infants by type of dwelling and number of rooms in different Study Groups

Centre and Study Group	Percentage distribution of Infants									
	Type of dwelling					Number of rooms				
	1	2	3	4	NR	1	2	3	4	NR
Bombay										
City	28.7	54.2	15.2	1.7	0.2	65.3	21.5	7.4	5.4	0.4
SU	14.8	57.1	26.6	1.5	–	47.3	35.0	10.3	7.4	–
R	32.7	25.5	1.0	39.8	1.0	43.9	37.7	9.2	9.2	–
T1	4.9	53.7	3.9	37.5	–	31.4	26.2	20.4	22.0	–
T2	9.4	58.0	0.8	31.8	–	44.7	30.7	9.6	15.0	–
All groups	19.3	53.7	10.8	16.0	0.2	52.1	26.6	10.5	10.6	0.2
Calcutta										
City	8.4	35.3	20.3	35.6	0.4	43.9	23.8	14.6	17.1	0.6
SU	28.8	17.4	1.9	51.9	–	57.7	26.9	5.8	9.6	–
R	40.8	6.0	2.0	51.2	–	36.8	37.2	16.8	8.0	1.2
T1	43.0	5.7	10.0	41.0	0.3	23.4	32.2	19.2	25.2	–
T2	24.6	5.3	12.3	57.5	0.3	32.2	31.2	13.3	23.3	–
All groups	26.3	15.7	12.7	45.0	0.3	36.0	29.8	15.4	18.3	0.5
Madras										
City	26.6	46.9	13.3	13.1	0.1	32.2	36.0	17.6	14.1	0.1
SU	43.2	29.5	4.5	22.7	–	36.4	22.7	23.9	17.0	–
R	63.0	16.6	1.4	19.0	–	47.7	30.0	13.0	9.3	–
T1	59.3	19.2	3.6	17.9	–	30.8	36.0	16.6	15.9	0.7
T2	34.7	47.4	4.5	13.4	–	38.6	37.7	9.4	14.3	–
All groups	39.2	37.5	8.1	15.2	0.1	35.3	34.9	15.7	13.9	0.2

Type of dwelling 1. Hut 2. Chawl 3. Apartment 4. Independent House *Number of rooms* The numbers indicate the number of rooms in the dwelling.

Table 3.3—Percentage distribution of infants by household and per capita income per month in different Study Groups

Centre and Study Group	Percentage Distribution of Infants by										
	Household Income P.M. (Rs.)					Per capita Income P.M. (Rs.)					
	300 or less	301-500	501-1000	1001 and more	NR	50 or less	51-100	101-150	151-200	201 and more	NR
Bombay											
City	12.0	27.6	37.1	20.8	2.5	10.1	40.6	20.0	12.5	14.2	2.6
SU	4.9	17.2	43.4	29.1	5.4	4.4	18.2	25.1	22.2	24.7	5.4
R	23.5	27.6	31.7	15.2	2.0	24.5	40.9	16.3	7.2	8.1	3.0
T1	18.4	26.5	38.2	14.6	2.3	18.1	33.0	23.4	10.3	12.8	2.4
T2	38.8	25.9	24.4	9.9	1.0	42.5	35.1	13.9	3.2	4.4	0.9
All groups	18.5	25.9	35.1	18.0	2.5	18.3	35.6	19.6	11.1	12.8	2.6
Calcutta											
City	25.6	29.8	26.8	14.8	3.0	20.6	42.8	14.5	10.1	9.0	3.0
SU	30.7	42.3	15.4	3.8	7.8	25.0	40.4	15.4	11.5	–	7.7
R	47.6	31.6	16.0	2.4	2.4	34.8	44.8	9.6	5.6	2.8	2.4
T1	29.4	26.7	22.8	6.5	4.6	41.0	37.1	8.8	4.6	3.6	4.9
T2	43.9	22.6	23.0	6.9	3.6	44.8	33.2	9.0	5.4	3.6	4.0
All groups	36.9	28.3	22.7	8.5	3.6	33.2	39.7	11.2	7.1	5.2	3.6
Madras											
City	35.7	25.0	23.7	15.1	0.5	27.0	37.7	15.1	7.8	11.7	0.7
SU	50.0	12.5	34.0	3.5	0.0	39.8	29.6	14.8	10.2	4.5	1.1
R	70.6	17.5	8.4	2.6	0.9	69.9	20.4	5.1	1.9	0.9	1.8
T1	57.9	22.5	15.9	2.6	1.0	52.3	32.1	9.3	3.3	2.0	1.0
T2	53.0	19.5	18.5	8.0	1.0	43.5	32.5	12.7	6.2	4.1	1.0
All groups	47.8	22.0	20.0	9.4	0.8	40.4	33.2	12.4	6.1	6.9	1.0

NR Not recorded

was very high as compared to Calcutta and Madras. Among the working mothers, the proportion of infants having mothers working on full-time basis was lower at Bombay as compared to that of the other two Centres.

Bombay also had a high number of infants whose parents were both working. These infants were 17.2% at Bombay, 3.6% at Calcutta and 4.5% at Madras. Infants whose parents were both not working numbered 27 (1.5%) at Bombay, 28 (2.0%) at Calcutta and 35 (2.0%) at Madras. Only in three cases at Bombay and in one each at Calcutta and Madras mothers were working and the fathers were not.

House-hold income and per capita income per month

According to the Draft Sixth Five Year Plan (India,1981) per capita income of Rs. 88/- and Rs. 76/- at 1979-80 prices, are the cut-off points for the poverty lines in urban and rural areas, respectively. We have adopted an interval of Rs. 50/- to Rs. 100/-. Per capita incomes of Rs. 101-200 form one category and those of above Rs.200/- form another one. The cut-off points mentioned in the Plan fall in the second category of per capita income between Rs. 51-100 p.m. given in the Table 3.3. We have considered those earning per capita incomes of Rs. 50/- or less to be 'very poor'. We de-

Table 3.4—Percentage distribution of Infants by place of delivery in different Study Groups

Centre and Study Group	Percentage distribution of infants by place of delivery			
	Home	Govenment/ Local body hospital	Private Hospital or Nursing Home	NR
Bombay				
City	13.8	59.2	26.9	0.1
SU	13.3	35.0	50.7	1.0
R	59.2	22.4	18.4	–
T1	9.6	32.5	57.6	0.3
T2	26.7	66.6	6.7	–
All groups	18.2	51.5	30.1	0.2
Calcutta				
City	25.5	57.6	16.5	0.4
SU	46.1	52.0	1.9	–
R	62.4	33.6	4.0	–
T1	29.6	58.3	9.8	2.3
T2	33.3	55.7	11.0	–
All groups	35.6	52.8	11.0	0.6
Madras				
City	9.0	65.2	25.6	0.2
SU	23.9	55.7	20.4	–
R	55.1	40.2	4.7	–
T1	30.3	41.7	27.7	0.3
T2	50.0	36.0	13.7	0.3
All groups	26.4	52.6	20.9	0.1

cided to have the corresponding cut-off point for house-hold income at Rs. 300/- p.m. for the poverty line.

While the sample at Bombay was characterised by extremes, the samples at both Madras and Calcutta were skewed with high percentage of poor.

Differences in socio-economic situations as between different Centres were statistically significant. The implication of this finding was that the samples at the three Centres could not be merged together. The analysis of data had to be done separately for each Centre.

Our respondents

The biological mothers of the infants were to be our respondents. But it was anticipated that in a few cases infants might not be in the care of their natural mothers and the investigators were instructed to interview women taking care of the infants.

Five infants were in the care of their grandmothers and one each of step-mother and some other women relatives. Five infants had been given in adoption and their adopted mothers looked after them. The adopted mothers were the respondents because their households were in our sample.

As many as 50% to 60% infants' mothers at the three Centres had married between 15 and 19 years of age. About 20%-25% infants' mothers had married when they were 20-24 years old.

Place of delivery

About half the infants were born in the medical institutions managed by the government or local bodies at all the Centres. The number of those born in private hospitals or at home, however, differed from Centre to Centre. More infants were born in private hospitals and nursing homes at Bombay (30%) than at Madras (21%) or Calcutta (11%) (Table 3.4). Deliveries conducted at home were more at Calcutta (36%) than at Madras (26%) or Bombay (18%).

The differences between the Study Groups relating to place of delivery at each Centre were quite conspicuous. Though they were in close physical proximity to the cities, the rural areas had the highest percentages of deliveries conducted at home at all the Centres; the situation was similar, though less pronounced, in the smaller towns (T2) everywhere. Within the Centre, in comparative terms, these percentages were lower in T1, SU and City at Bombay; City, T1 and T2 at Calcutta; and City, SU and T1 at Madras. These Study Groups also had a higher percentage of infants born in private hospitals and nursing homes.

Chapter 4

Initiation and Establishment of Breast-feeding

It is now widely held that the infant should be put to breast as soon after birth as possible, after the mother recovers from the immediate physical exhaustion of labour and delivery. The unique nutritional properties of colostrum, and the disadvantages to the infant of discarding colostrum are now well-recognised. It is, therefore, important to know, how soon after birth the infant is put to breast.

The practice in this regard was found to vary a great deal in the three Centres. The data are presented in Table 4.1 and Charts 4.1 and 4.2.

At the Bombay Centre, breast-feeding was initiated only after 48 hours after birth in an overwhelming majority (79%) of infants. Seventeen percent infants received their first breast-feed between 24 to 48 hours after birth, and only 3% within the first 24 hours.

On the other hand, at the Calcutta Centre, as many as 48% of infants were put to breast within 24 hours after birth, another 18% between 24 to 48 hours and only the remaining one-third of infants had to wait till the third day to start obtaining breast-feed.

The Madras Centre seemed to occupy an intermediate position. Twentyfour percent of infants received their first breast-feed within 24 hours after birth, 16% between 24 to 48 hours and the remaining one-third had to wait for longer than 48 hours.

There were differences between Study Groups within each Centre. Notwithstanding these differences, in *all* Study Groups an overwhelming majority of infants were put to breast for the first time, only after 48 hours after birth at Bombay. The salutary practice of initiating breast-feeding within 24 hours after birth was evident in all Study Groups at Calcutta in a much higher proportion (39% to 63%) than in Bombay (less than 5%) and in Madras (9% to 31%).

In all Centres, the percentage of children receiving their first breast-feed more than 48 hours after birth, was higher in the rural areas than in the cities.

In all Centres, breast-feeding was initiated more than 48 hours after birth, in a higher proportion of infants born at home (86%, 41% and 81% in Bombay, Calcutta and Madras respectively) than in infants born in Government or private hospitals (76%-78%, 28%-37%, and 52%-54% in Bombay, Calcutta and Madras respectively).

Pre-lacteal feeds

The practice of giving the infants some feed before breast-feeding was initiated was found to be widespread in all three Centres.

At the Bombay Centre, only 14% of all infants in the entire study, did not receive any pre-lacteal feed. Of these, 2% were infants in whom breast-feeding was initiated within 24 hours, a little

Table 4.1—Time of first breast-feed and type of pre-lacteal feeds

Centre	Bombay (N-1820)				Calcutta (N-1377)				Madras (N-1729)			
	a	b	c	Total	a	b	c	Total	a	b	c	Total
First breast-feed	3.4	16.5	79.2	99.1	47.6	17.7	33.5	98.8	23.8	15.5	60.2	99.5
First feed												
Breast-feed (no pre-lacteal feeding)	2.0	2.4	9.2	13.6	22.2	2.0	0.7	24.9	11.2	0.6	0.2	12.0
Pre-lacteal feeds												
CM	—	0.7	3.7	4.4	0.9	0.7	3.7	5.3	0.1	0.1	0.3	0.5
AM	0.1	2.6	20.4	23.1	2.2	1.9	5.5	9.6	0.1	0.2	1.3	1.3
Unidentified milk	0.2	0.9	4.5	5.6	0.1	–	–	0.1	–	–	–	–
Sweetened water	0.6	5.7	24.2	30.5	14.4	8.7	16.1	39.2	12.0	13.8	56.9	82.6
Honey	0.4	2.9	17.1	20.4	5.4	3.1	6.7	15.2	0.1	0.2	0.3	0.6
Jaggery water	–	0.1	0.8	0.9	–	0.1	0.1	0.62	–	0.1	0.2	0.3
Breast-fed by other women	–	–	0.1	0.1	–	–	0.1	0.1	–	–	–	–
Others	0.1	0.3	2.9	3.3	–	0.1	0.1	0.2	0.1	0.1	0.3	0.5
Plain water	0.4	2.5	13.3	16.2	6.2	2.3	2.8	11.3	0.3	0.2	0.8	1.3
Cannot say	0.1	0.7	1.7	2.5	1.0	1.0	1.4	3.4	0.2	0.3	0.6	1.1
Not put to the breast		0.6				0.8				0.5		
NR		0.3				0.4				–		

a Breast-fed within 24 hours; b Breast-fed between 24-47 hours; c Breast-fed after 48 hours.
CM Commercial milk AM Animal milk; NR Not recorded.

Chart 4.1—Infants in different Study Groups by time of initiation of breast-feed

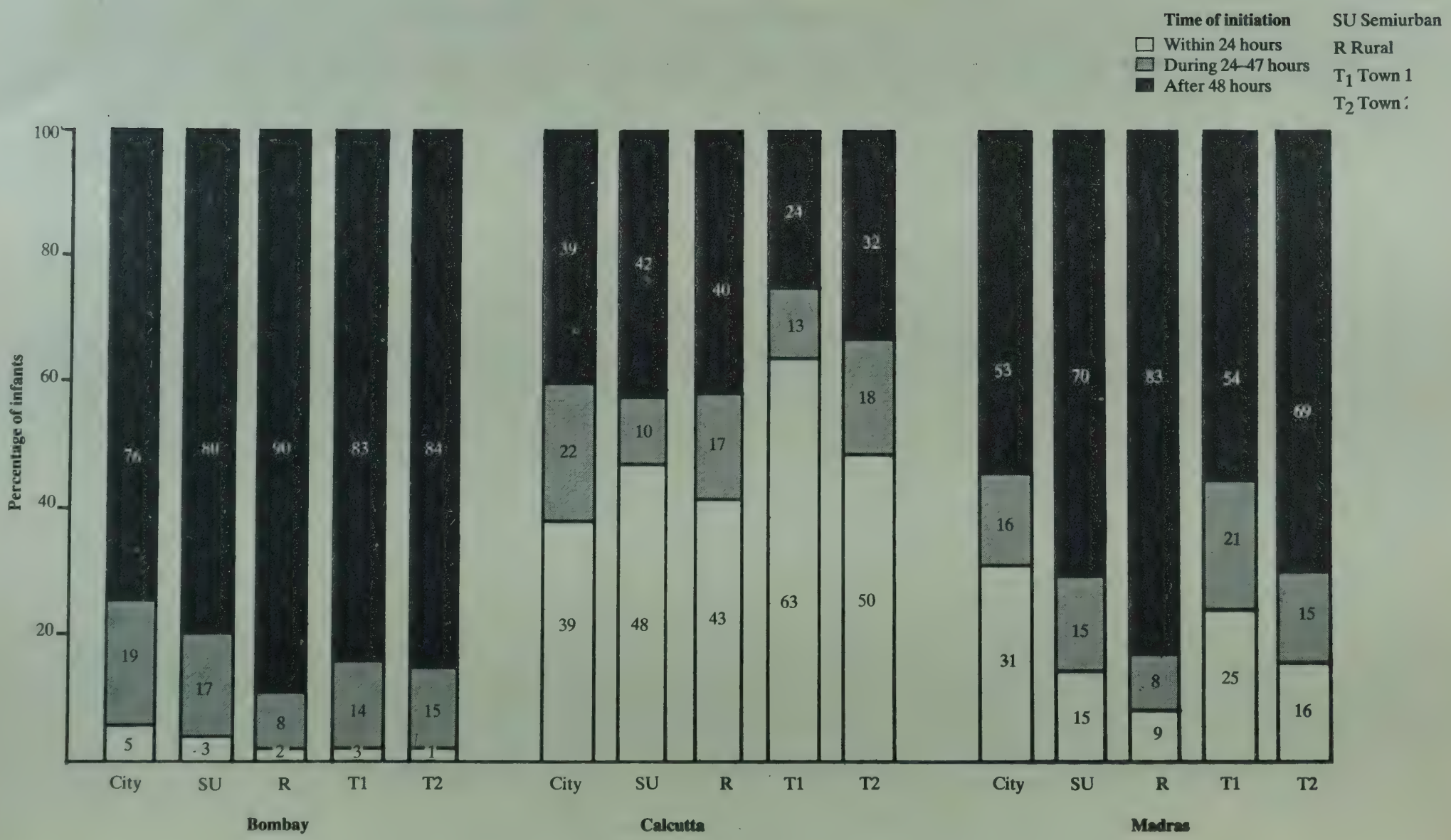
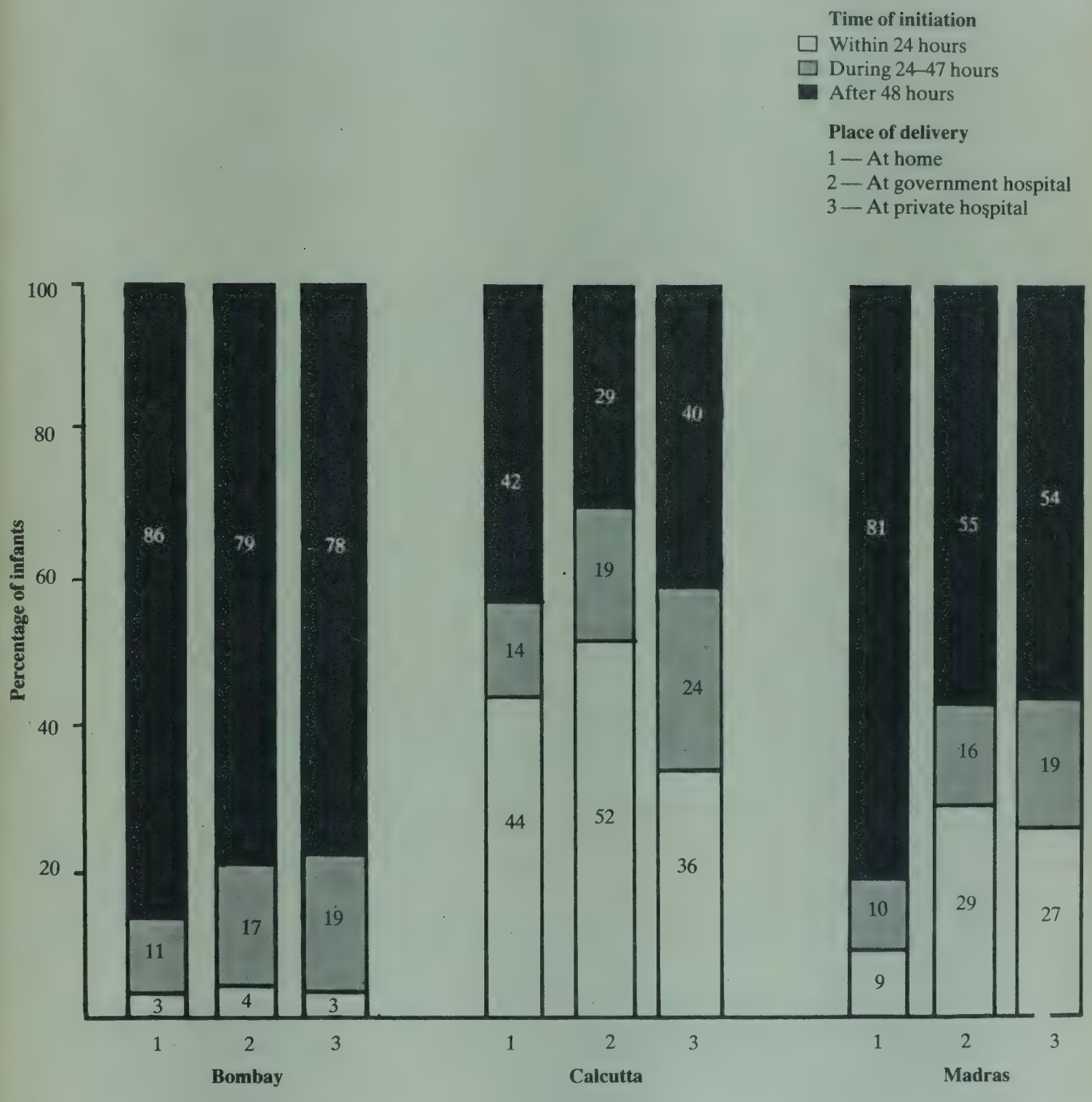


Chart 4.2—Time of initiation of breast-feed and place of delivery



over 2% were infants who were put to breast between 24-48 hours after birth; the remaining 9% were infants who started getting breast milk only 48 hours after birth. These latter infants thus received no feeds for the first 48 hours after birth. Of the 86% of infants at Bombay who received pre-lacteal feeds, there was a very small number of infants who were receiving both breast milk and pre-lacteal feeds within the first 24 hours after birth. The usual pre-lacteal feeds were sweetened water — sweetened with sugar, glucose or jaggery (31%), animal milk (23%) and honey (20%). The disturbing finding was that 4.4% of infants were given commercial milk foods (CM) as pre-lacteal feed. An additional 6% were given 'some milk' as a pre-lacteal feed but the mothers were not sure whether it was commercial milk food or animal milk, as all these mothers/infants were in the hospitals at the time and the infants were being fed by nurses. In all likelihood, these infants (or at least most of them) were in fact receiving commercial milk foods (CM). Thus it would appear that 10% of infants in Bombay were introduced to CM *before* breast-feeding could be initiated, and most of these were infants delivered in hospitals.

The longer the wait before breast-feeding was initiated, the greater the use of commercial milk foods as pre-lacteal feed. Thus among infants put to breast within 24 hours after birth, 8% were given pre-lacteal feeds of CM; the percentage shot up to 25% for infants who received their first breast-feed between 24-48 hours and to 30% for those in whom feeding was initiated more than 48 hours after birth.

At the Calcutta Centre, though breast-feeding was initiated within 24 hours in 47.6% of all infants, more than half of them received pre-lacteal feeds in addition. The pre-lacteal food in wide use in Calcutta was either sweetened water or honey. In Calcutta also 5.3% of infants received CM as pre-lacteal feed. This again, as in Bombay, may be an underestimate, as many of the infants reported to have received 'milk' in hospitals, might have received CM.

In the Madras Centre, the most widely used pre-lacteal feed was water sweetened with sugar, glucose or jaggery. Unlike in Bombay and Calcutta, the use of CM as pre-lacteal feed was insignificant.

Plain water was the pre-lacteal feed in 16% of infants in Bombay, 11% in Calcutta and 1% in Madras. Other foods used as pre-lacteal feeds in all Centres on a much smaller scale were 'gripe-water', *ghutti,* tea, coffee. In rare instances, a nursing woman other than the mother provided her breast milk to the infant, before the mother could initiate breast-feeding. Castor oil was used as pre-lacteal feed in 2.3% of infants in Bombay, but if all infants from the three Centres were considered together, this practice of giving castor oil was found to be negligible.

It will thus be seen that the practice of using commercial milk food as pre-lacteal feed was seen in a significant proportion of infants in Bombay and Calcutta, unlike in Madras. In both Bombay and Calcutta, this practice was commoner in infants of mothers with higher educational status (7% and 15% in Bombay and Calcutta respectively), than in those of mothers with lower educational status (4% and 3% in Bombay and Calcutta). It was much commoner in infants of families of high income levels of more than Rs. 201 per capita per mensem (12% in Bombay and 22% in Calcutta) than in infants of families of low income of Rs.50 per capita per mensem or less (1.5% in Bombay and 1% in Calcutta). It was commoner in infants born in hospitals than in those born in homes. Thus 9% of infants born in private hospitals and 4% in government hospitals received CM as pre-lacteal feed as against 1% of infants born at homes in Bombay. The corresponding figures for Calcutta were 18%, 6% and 0.2%. In the interpretation of these data, it must of course be remembered that affluence, higher level of education and delivery in hospitals (as against homes) often go together. CM was more often used as pre-lacteal feed in infants who were put to breast more than 48 hours after birth (11%) than those in whom breast-feeding was initiated earlier (less than 4%).

The practice of offering pre-lacteal feeds with a bottle (thus introducing the 'bottle' to the infant before the breast), was followed with respect to as many as 19% of infants born in Bombay and 5% in Calcutta. The practice was negligible in Madras. In

Bombay, it was mostly infants who were given CM as pre-lacteal feed that were fed by bottle.

Pre-lacteal feeding and subsequent lactation performance

Table 4.2 sets out data which provide an indication of the relationship between pre-lacteal feeding and subsequent lactation performance. It will be noticed that in all the three Centres, a much higher proportion of infants who received *no* pre-lacteal feeds were exclusively breast-fed for longer duration than those who received pre-lacteal feeds. In all the three Centres, the highest proportions of infants who started receiving supplements in early infancy were seen in those who had received CM as pre-lacteal feed. These observations do not necessarily prove a cause and effect relationship between pre-lacteal 'experience' and subsequent lactation performance. Both these practices may well be attributable to a common factor such as lack of maternal motivation, affluence, and/or inadequacy of lactation performance. Since the longer the period after birth before breast-feeding is initiated the greater the chances (and need) for prelacteal feeding, these observations must serve to further underscore the need to educate mothers to put their babies to breast as soon as possible after delivery.

Establishment of lactation

A period of 15-20 days of continuous breast-feeding after birth was considered in this Study, as the criterion necessary to confirm the establishment of lactaion. If breast-feeding was given up before this point, the child was considered to be as good as 'never-breast-fed'. The number of such 'never-breast-fed' infants was small: 42 of 1820 infants in Bombay (2.3%), 26 of 1377 infants in Calcutta (1.9%), and 54 of 1729 infants in Madras (3.1%). While in Bombay and Calcutta the proportion of 'never-breast-fed' infants belonging to higher income groups was greater than among those belonging to the poorer income groups. This relationship was not observed in Madras. In all Centres, there were 'never-breast-fed' infants among the poor and among the rural population as well, though they constituted a very small proportion of all infants in these groups.

Eleven of the 42 'never-breast-fed' infants at Bombay, 12 of 26 at Calcutta and 15 of 54 at

Table 4.2 — Age of infants at starting supplementary food in relation to type of pre-lacteal feed

Pre-lacteal Feed	Percentage of infants started on supplementary food								
	Before end of one month			Before end of four months			Before end of six months		
	1	2	3	1	2	3	1	2	3
CM	56.1	75.3	100.0	92.5	94.2	–	98.5	100.0	–
AM	26.6	44.1	60.0	69.6	84.4	85.0	87.3	98.7	100.0
Milk not identified	33.3	–	–	88.8	–	–	96.3	–	–
Others	23.9	45.9	28.3	70.8	89.0	80.7	90.6	97.4	93.6
No pre-lacteal feed	21.9	34.4	29.6	66.7	85.2	86.1	87.6	94.9	93.9

1. Bombay 2. Calcutta 3 Madras CM Commercial Milk AM Animal Milk.

Madras were not put to breast at all.

Reasons for 'never-breast-feeding', as advanced by the mothers are set out in Table 4.3.

Table 4.3 — Reasons given for not establishing breast-feeding

Centre	Distribution of 'never-breast-fed' infants by reason								
	1	2	3	4	5	6	7	NR	Total
Bombay	28	4	4	3	1	–	2	–	42
Calcutta	9	7	2	1	1	1	1	4	26
Madras	35	6	3	–	–	1	1	8	54

(1) No breast milk or inadequate quantity of breast milk; (2) Problems with nipple or child's lips; (3) Illness of mother; (4) Illness of child; (5) Advised by health personnel*; (6) Mother is figure-conscious; (7) Mother not staying with child. * Information as given by the mother. Information elicited on further specific questioning is discussed below.

In addition to the question on the reasons for never breast-feeding, the mothers were specifically asked if they had been advised by any one not to breast-feed the child. At Bombay, 30 out of 42 mothers responded to the query and six of them said that they were given this advice by doctors. The reasons for the advice were: mother was diabetic (1), she had "TB" (1), she was ill (illness not identified) (1), child was ill (1), the child was premature (1), and "the blood-groups of the motner and the child did not match" (1). At Madras 46 mothers answered our question. Apart from six of these all others said that they had received no such advice.

Had these mothers made any attempt at establishing breast-feeding? Thirty-eight of the 42 mothers at Bombay answered this question. Twenty mothers said that they continued to nurse the child for some time but the others said that they did not make any efforts. Among the 20 mothers who had made an attempt, six did so for only about a week. Three mothers took action in other directions such as consulting a doctor and taking medicine to increase the output of milk in addition to persevering with breast-feeding. At Calcutta, the information was available for 17 mothers, seven of whom made a continued effort at breast-feeding, though it was only for a week or so in the case of two mothers. The remaining ten did not make any attempt. Two mothers consulted a doctor as well. At Madras, 30 of the 37 mothers who answered our question said that they continued to put the child to breast; 13 of them, however, gave up after a week's time. Seven mothers did not make any attempt.

The category of 'never-breast-fed' infants may be considered to include two broad subcategories: (a) infants of the affluent high socio-economic groups whose mothers may not (or may) have suffered true lactation failure, and (b) infants of poor mothers who must have suffered from either primary or secondary lactation failure. It is important that the proportion of such mothers is indeed very low.

"On demand" or "on schedule" feeding

Breast-feeds may be given either on 'demand' *i.e.* whenever a child cries indicating hunger or may be given on the basis of a regular time schedule. Current advice is to feed "on demand". A large percentage of nursing mothers at Calcutta (96%) and Madras (93%) and 83% at Bombay were feeding their infants "on demand". Sixteen per cent of infants at Bombay, 3% at Calcutta and 7% at Madras were fed "on schedule".

Larger proportions of mothers in the 'elite groups' still seem to be under the influence of the advice to feed "on schedule". These groups tend to have similar characteristics at all the three Centres. Briefly, the infants breast-fed "on schedule" belonged to high socio-economic groups and their mothers were better educated.

Frequency of feeding

Many mothers including some of those who were feeding the child "on demand" could tell us the number of times in the day when they put the child to breast. However, as many as 15 per cent mothers at Bombay and 10 per cent at Madras could not give us the number. The process of feeding "on demand" went on in such a way that the mothers could not decide upon any particular number and we accepted this fact. Under the situation, we can, for purposes of analysis, safely club the category "cannot say" with the category "11 or more". (Table 4.4)

The distribution of breast-fed infants in the 'very young' (under 3 months), 'young' (3-6 months) and 'older' (more than 6 months) infants was 425, 423 and 771 at Bombay, 372, 350 and 569 at Calcutta, and 405, 346 and 696 at Madras.

That older infants would get fewer breast-feeds is only to be expected. Yet, a majority of infants even in 'older' age-group continued to get more than six feeds per day. There were differences between the Centres. More infants at Calcutta received more number of feeds.

By and large, there were very few among the 'very young' breast-fed infants who were given less than five breast-feeds in a day. At Calcutta and Madras, among 'very young' infants fed "on schedule", 44% and 26% respectively were breast-fed less than five times a day. These proportions were much higher than those among *all* 'very young' infants, which were 4% and 6% at the two Centres respectively. Twenty-one per cent of infants in this age-group at Calcutta belonged to families with a high monthly per capita income of Rs. 201 or above. (Table 4.5)

At the other end were the older children who were breast-fed 11 or more times a day (Table 4.6). At Bombay, Calcutta and Madras 27, 35 and 23 per cent infants respectively belonged to this category. Our data show that income and mother's education are important factors in this connection. Infants of this category were definitely more at all Centres, in families with a low monthly per capita income of Rs. 50 or less and with illiterate mothers. It is possible that in the case of infants of poor mothers who could not afford supplementary foods, the frequency of breast-feeding was greater.

Difficulties in breast-feeding

A majority of mothers at Bombay (95%) and Madras (98%) did not have any difficulty in breast-feeding. At Bombay, 36 mothers had "some problem" with the breasts; eight had a child who could not suck; another group of 38 mothers reported some illness which prevented them from breast-feeding. At Madras 33 mothers had reported difficulties and 29 of these said that there was "some problem" with the breasts.

Comparatively, the number of mothers with problems in breast-feeding was more at Calcutta. As many as 13% of the nursing mothers talked of some problem or the other. Many of those mentioning a problem (about two-thirds of these mothers) talked about their 'weakness' and 'illnesses' and a few of "problems with the breasts".

Breaks in breast-feeding

How many mothers who had established lactation and who had not yet completely weaned their infants had to disrupt breast-feeding for one reason or the other? We considered breaks of more than three days duration. Not many mothers stopped breast-feeding for more than three days. Those who did so once were 44, 27 and 8 at Bombay, Calcutta and Madras respectively. Just three mothers at Bombay, only one at Calcutta but none at Madras reported two breaks. The reason for a temporary stoppage was usually either mother's illness or the infant's illness. The mothers giving these reasons were 22 and 23 at Bombay, 17 and 11 at Calcutta and 4 and 3 at Madras. Other reasons for temporary stoppage included inadequacy of breast milk and advice from a doctor to stop breast-feding temporarily.

Table 4.4—Average number of breast-feeds per day

Centres	Age-group	Percentage distribution of breast-fed infants by number of feeds											
		1-2	3-4	5-6	7-8	9-10	11+	Cannot say	NR	Total	Sample size (N)	Mean	SD
Bombay	Very young	0.7	2.8	14.6	32.9	21.4	12.5	15.1	–	100.0	425	8.6	2.3
	Young	1.0	6.9	21.5	28.6	16.0	11.1	14.7	0.2	100.0	423	8.1	2.6
	Older	1.6	8.0	23.0	24.1	16.0	11.1	16.0	0.2	100.0	771	8.0	2.7
	Total	1.1	6.4	20.4	27.6	17.4	11.5	15.4	0.2	100.0	1619	8.2	2.6
Calcutta	Very young	0.3	3.8	10.7	14.5	16.4	52.4	1.1	0.8	100.0	372	9.5	2.4
	Young	0.9	3.4	13.7	18.3	19.1	43.1	0.9	0.6	100.0	350	9.1	2.5
	Older	1.2	5.4	16.9	20.9	19.0	34.8	0.9	0.9	100.0	569	8.6	2.7
	Total	0.8	4.4	14.3	18.4	18.3	42.1	0.9	0.8	100.0	1291	9.0	2.6
Madras	Very young	–	6.2	14.8	31.6	23.5	16.5	7.2	0.2	100.0	405	8.4	2.4
	Young	1.4	8.4	19.4	35.8	17.1	9.5	8.4	–	100.0	346	7.8	2.4
	Older	1.9	9.3	23.0	27.8	15.1	10.4	12.5	–	100.0	696	7.8	2.7
	Total	1.2	8.2	19.9	30.8	17.9	11.9	10.0	0.1	100.0	1447	8.0	2.6

N R Not recorded

Table 4.5—Distribution of very young infants (0-3 months) according to number of breast-feeds given

Centres		Percentage distribution of very young infants by number of breast-feeds per day		
		4 or less	5 - 10	11 +
Bombay				
Nature of feeding	On demand	3.0	65.7	31.3
	On schedule	6.6	86.9	6.5
Per capita income p.m. (Rs.)	50 or less	4.0	65.6	30.4
	51-100	2.6	69.2	28.2
	101-150	3.8	71.2	25.0
	151-200	–	67.2	32.3
	201 +	7.5	75.0	17.5
Calcutta				
Nature of feeding	On demand	3.0	41.2	55.0
	On schedule	44.4	55.6	–
Per capita income p.m. (Rs.)	50 or less	5.0	31.4	62.8
	51-100	3.2	41.8	53.8
	101-150	–	55.9	44.1
	151-200	–	50.0	50.0
	201 +	21.0	63.2	15.8
Madras				
Nature of feeding	On demand	5.2	69.7	24.9
	On schedule	26.3	73.7	–
Per capita income p.m. (Rs.)	50 or less	6.1	66.7	26.7
	51-100	6.2	65.4	28.4
	101-150	7.0	83.7	9.3
	151-200	8.3	83.4	8.3
	201 +	5.0	80.0	15.0

The row totals may not add upto 100.0 as NR category is not presented in the Table.

Table 4.6—Distribution of older infants (6-12 months) according to number of breast-feeds given

Centres		Percentage distribution of older infants by number of breast-feeds per day		
		4 or less	5 - 10	11 +
Bombay				
Per capita income p.m. (Rs.)				
	50 or less	7.5	59.6	32.9
	51-100	6.0	62.2	31.5
	101-150	10.7	62.5	26.8
	151-200	10.7	70.7	18.6
	201 +	25.7	66.7	7.6
Mother's education				
	Illiterate	3.9	58.7	37.0
	Primary + middle school	9.3	63.0	27.3
	High school +	17.8	68.8	13.4
Calcutta				
Per capita income p.m. (Rs.)				
	50 or less	2.5	49.0	47.0
	51-100	3.6	61.5	34.9
	101-150	11.0	62.5	24.5
	151-200	23.5	50.0	26.5
	201 +	32.0	64.0	4.0
Mother's education				
	Illiterate	1.8	45.6	51.5
	Primary + middle school	2.7	69.8	27.5
	High school +	20.4	65.5	13.4
Madras				
Per capita income p.m. (Rs.)				
	50 or less	7.1	64.4	28.5
	51-100	12.8	69.1	18.1
	101-150	14.3	66.7	19.0
	151-200	16.7	66.7	16.6
	201 +	22.0	54.3	22.8
Mother's education:				
	Illiterate	6.2	62.6	31.2
	Primary + middle school	10.8	67.0	22.2
	High school +	15.3	67.0	17.7

The row totals may not add up to 100.0 as NR category is not presented in the Table.

Table 4.7—Special foods for nursing mothers

Centres and Study Groups	Percentage distribution of nursing mothers taking special food			
	Takes special food	Does not take special food	Total	N
Bombay				
City	14.8	85.2	100.0	698
SU	12.3	87.7	100.0	171
R	10.6	89.4	100.0	94
T1	13.8	86.2	100.0	282
T2	14.7	85.3	100.0	368
Total	14.1	85.9	100.0	
Sample size (N)	227	1386	–	1613
Calcutta				
City	56.0	44.0	100.0	416
SU	39.6	60.4	100.0	48
R	40.7	59.3	100.0	241
T1	21.0	79.0	100.0	290
T2	39.5	60.5	100.0	291
Total	40.9	59.1	100.0	
Sample size (N)	526	760	–	1286
Madras				
City	14.2	85.8	100.0	661
SU	14.1	85.9	100.0	71
R	5.6	94.4	100.0	196
T1	8.1	91.9	100.0	260
T2	6.8	93.2	100.0	250
Total	10.6	89.4	100.0	
Sample size (N)	153	1285	–	1438

Table 4.8—Nature of special foods for nursing mothers

Centres	Percentage of nursing mothers by special food									
	Milk and milk preparations	Special preparations	Eggs	Non-veg. preparations	Fruits	Family diet	Tonics vitamins	Number of nursing mothers taking special food	Mothers not taking special food	All nursing mothers
Bombay	41.4	10.6	6.2	4.8	8.8	37.4	2.2	228	1386	1614
Calcutta	39.2	–	7.0	1.7	11.6	42.8	7.2	526	760	1286
Madras	32.0	1.9	3.2	27.1	–	37.4	25.8	153	1284	1437

Percentages may not add upto 100.0 due to multiple responses.

"Special" foods used by nursing mothers

Fourteen per cent (of 1613 mothers) at Bombay, 41 per cent (of 1286 mothers) at Calcutta, and 11 per cent (of 1438 mothers) at Madras were taking "some more diet than what they would normally take". Their percentage in different Study Groups ranged between 11 and 15 at Bombay, between 21 and 56 at Calcutta and between 7 and 14 at Madras. Tables 4.7 and 4.8 give the details. Thus the practice of taking special foods by mothers during lactation was more widely prevalent at Calcutta than at other Centres.

A majority of the nursing mothers who were on special diet consumed more milk or had some milk preparation; their percentages were 41, 39 and 32 at Bombay, Calcutta and Madras, respectively. Some food items traditionally considered helpful in improving mothers' health and her capacity to breast-feed like preparations of *Methi, laddoos* of *Rawa, Besan,* gum, etc. were mentioned by 11 per cent at Bombay, by nobody at Calcutta and by only 2 per cent at Madras. Eggs were not taken by many; those who did so as an additional item were very few at Bombay (6%), Calcutta (7%), and Madras (3%). Non-vegetarian dishes were consumed more at Madras (27%) than at Calcutta (2%) and Bombay (5%). Fruits were selected by some at Bombay (9%) and Calcutta (12%) but by nobody at Madras where tonics and vitamins or malt foods were taken by comparatively more mothers (26%). Though tonics and vitamins were not so common at Bombay (2%) and Calcutta (7%), as many as 30 per cent mothers in T1 at Calcutta were taking them. Four mothers preferred taking less quantity of food. This practice was not found at Madras.

On the whole, eating the everyday food in larger quanitities or taking milk were common everywhere. Among other items, specially meant for a nursing mother, fruits and eggs were taken by some mothers at Bombay; fruits, tonics and vitamins by some at Calcutta while non-vegetarian preparations and tonics and vitamins were preferred by many at Madras.

The duration over which nursing mothers took "special foods" over and above their normal diet was varied. At Bombay 42% mothers and 44% mothers at Calcutta could do so for a short duration of less than a month. The percentages of those who did so for 1-3 months were 22, 49 and 20 at Bombay, Calcutta and Madras, respectively. Another relevant finding at Calcutta was that birth-order of the child was an important factor; the proportion of mothers taking special foods was higher (52%) when mothers nursed their first-born.

Chapter 5

Duration of Breast-feeding

"Breast-feed as long as possible" has always been considered to be good advice. But how long do Indian mothers breast-feed their children? A child may be breast-fed (a) "exclusively", or (b) partially and given "supplementary" feed and, there comes a time when a child is no longer breast-fed ("completely weaned") and is entirely on "substitute foods". In this section data on the duration of "exclusive" breast-feeding and reasons for continuing it for infants of 6-12 months and data on "total duration" of breast-feeding (exclusive plus partial breast-feeding) for 12-month-old infants, are presented.

In order to get a reliable estimate of the duration of 'exclusive' breast-feeding, we have taken into consideration here infants who were in the age-group of 10-12 months at the time of interview.

Chart 5.1 gives percentages of breast-fed infants at different ages. The decline in percentage of exclusively breast-fed infants with increasing age is much more gradual up to four months at Bombay (100 ----- 87 ----- 85 ----- 74 ----- 66) than at both Calcutta (100 ---- 81 ----- 51 ----- 47 ---- 35) and Madras (100 ----- 95 ----- 71 ----- 69 ----- 45). At the age of eight months too the percentage was the highest at Bombay (21) than at Calcutta (14) and Madras (9).

It is generally considered desirable that infants are exclusively breast-fed at least for the first four months after birth. In very poor groups, beset with problems of poor environmental sanitation and lack of safe water, the balance of advantage may be in prolonging the duration of 'exclusive' breast-feeding up to six months. But beyond this point of time, supplementary food will be necessary in *all* cases, since breast milk output by then, even if normal, will not be adequate; the chances then are that advantages of avoidance of diarrhoeas incidental to feeding of supplementary foods using unsafe water, may be outweighed by highly inadequate nutrient intake.

A higher proportion of infants was exclusively breast-fed in Bombay than at Madras, and more so, at Calcutta. This may be viewed as reflecting a relatively better situation in this regard as far as Bombay is concerned. On the other hand, the larger proportion of infants beyond six months of age still being exclusively breast-fed in Bombay, as compared to Calcutta, and more so, at Madras, reflects a relatively more unfavourable situation in this regard at Bombay.

At Bombay one out of every four nine-month-olds was on breast milk alone. The percentage declined rather gradually to eight for the 12-month-olds. At Calcutta, the corresponding decline was much sharper from a lower 18 per cent to six per cent.

Since the present Study concerns infants up to one year of age, the mean duration computed and presented here only pertains to this group of infants. Table 5.1 which covers infants aged 10-12 months shows their distribution by duration of exclusive breast feeding.

The mean durations were 5.8, 4.1 and 4.5 months at Bombay, Calcutta and Madras, respect-

Chart 5.1—Percentages of (a) breast-fed and (b) exclusively breast-fed infants at different ages

Exclusively breast-fed — only breast milk and no supplements
Breast-fed — Breast milk with or without supplements

A	breast-fed	Bombay
B	breast-fed	Calcutta
C	breast-fed	Madras
D	exclusively breast-fed	Bombay
E	exclusively breast-fed	Calcutta
F	exclusively breast-fed	Madras

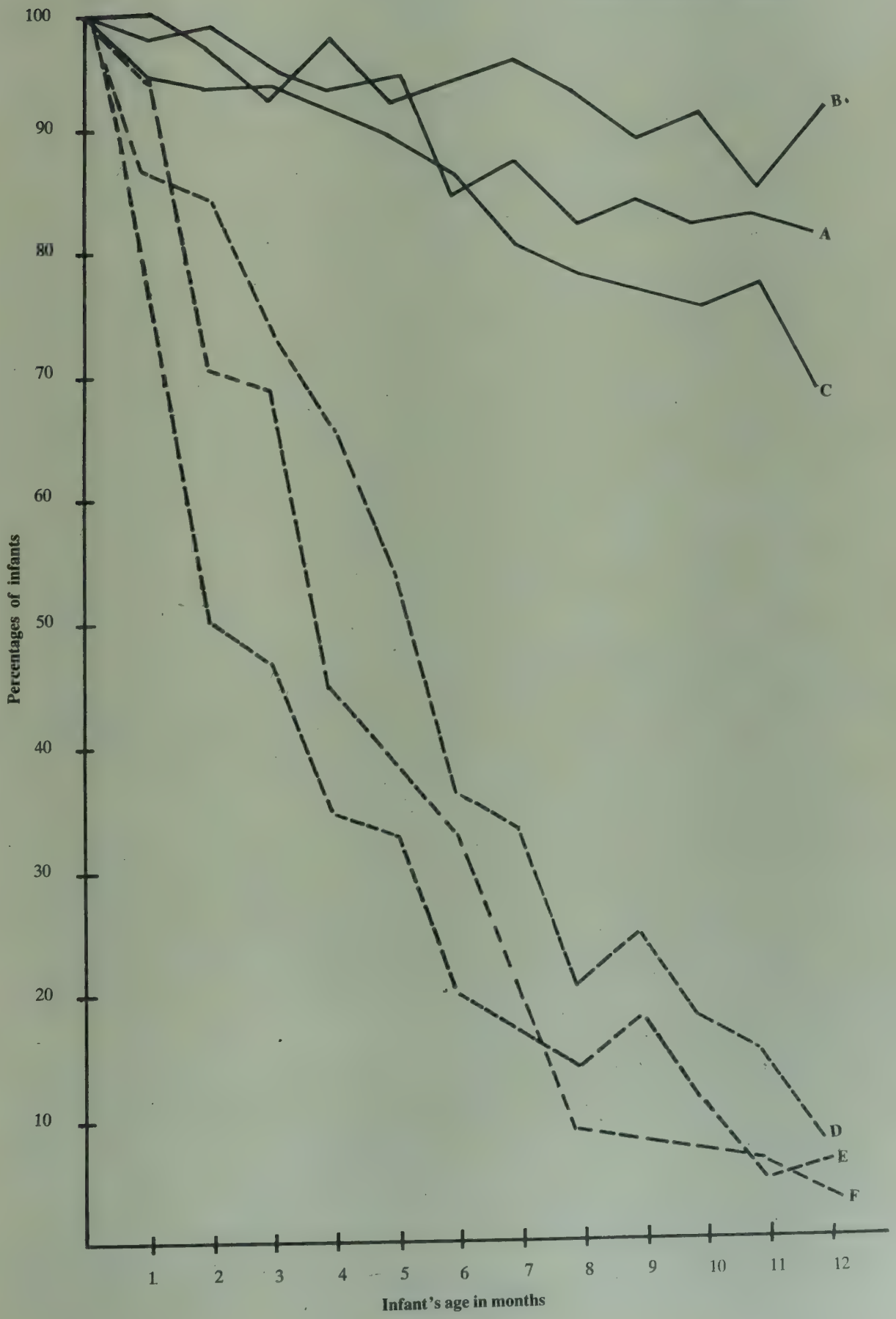


Table 5.1—Duration of exclusive breast-feeding of infants aged 10 - 12 months

Duration (in months) of exclusive breast-feeding	Percentage distribution of infants of 10 - 12 months		
	Bombay	Calcutta	Madras
Less than one month	8.4	9.8	2.7
1	6.3	22.3	19.0
2	8.8	14.9	7.0
3	16.4	16.9	30.4
4	8.0	7.1	5.7
5	6.7	5.1	12.9
6	9.3	5.5	3.9
7	6.7	4.7	5.5
8	5.6	3.9	2.0
9	5.8	0.8	3.5
10	9.0	5.9	3.3
11	6.2	2.0	2.8
12	2.8	1.1	1.3
Total	100.0	100.0	100.0
Sample Size (N)	464	255	457
Mean	5.8	4.1	4.5
SD	3.5	3.1	2.8

ively. The markedly large standard deviations observed at all the three Centres indicate the wide variability and is to be expected.

These findings suggest that education with regard to breast-feeding practice has to be tailored to meet the peculiar situation in each region. Thus at Madras, almost equal efforts would be needed to promote exclusive breast-feeding of younger infants as to promote introduction of supplemental foods at least by the end of six months. At Bombay, greater emphasis may be needed to reduce the proportion of infants who get nothing but breast milk beyond six months. At Calcutta, we face the truly difficult task of encouraging breast-feeding for longer durations than at present.

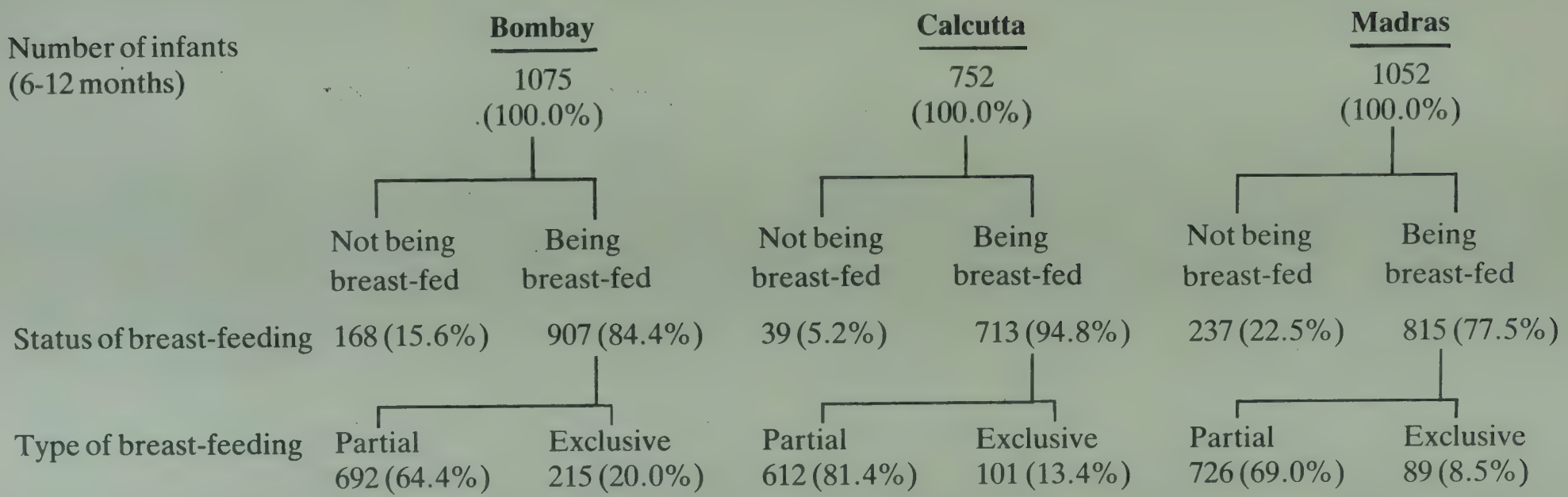
Exclusive breast-feeding beyond six months

In order to provide an idea of the scale on which the practice of exclusive breast-feeding beyond six months prevailed, data in this regard for infants of 6-12 months are presented in Chart 5.2. This age-group was selected as representative of infants who definitely need supplemental food to meet their nutritional needs.

It is seen that this practice was more prevalent at Bombay than at Calcutta and Madras. Twenty per cent of infants of 6-12 months were nursed by their mothers and did not get any supplementary foods. Corresponding percentages for Calcutta and Madras were 13 and 8 respectively.

Reasons advanced by mothers for prolonged exclusive breast-feeding and non-introduction of supplemental foods beyond six months are presented in Table 5.2. The major reason advanced was that the mother felt that her breast milk was adequately fulfilling the child's needs. This reason was given for more than half of the exclusively breast-fed 6-12-month-olds at Bombay and Calcutta and for 38 per cent at Madras. One out of

Chart 5.2 — Feeding status of infants of 6-12 months



The group of infants 'not being breast-fed' includes those completely weaned and those never breast-fed.

Table 5.2—Reasons for prolonged breast-feeding of infants aged 6-12 months

Reasons	Percentage of infants		
	Bombay	Calcutta	Madras
Mother has sufficient breast milk	55.4	51.5	38.2
Child is too young to start supplementary foods	15.4	8.9	32.6
Child does not accept supplementary food	16.2	10.9	13.5
Child gets some illness with supplementary foods	6.5	5.0	4.5
Parents cannot afford the cost of supplementary foods	6.1	18.8	12.3
Nobody has advised mother to start supplementary foods	0.5	2.0	1.1
Reasons not given	2.7	6.9	–
Sample size (N)	215	101	89

The percentages do not add upto 100.0 on account of multiple responses.

every three such infants at Madras and 15% of such infants in Bombay were considered to be "too young to digest anything else". Infants' disinclination to take anything besides breast milk, was given as a reason for 11-16 per cent infants at the three Centres. This reason implies that the mothers had made attempts to give supplemental foods but had given up because of infants' negative response. Parents' inability to afford the cost of supplementary foods was another fairly important factor, especially at Calcutta and Madras. It is difficult to say if this reason was at the back of minds of mothers who claimed that they themselves could meet the infants' requirements. It is possible that poverty rather than ignorance was the major factor in many cases.

"Total duration" of breast-feeding

The observations in this Study were confined to infants less than one year old. In the course of this Study it was noticed that several children more than one year old were still on breast-feed. The term 'total duration' used in this Study refers to the duration of breast-feeding (either exclusive or along with supplementary foods) in infants less than one year of age.

In order to get a reliable estimate of total duration, only data on infants of 10-12 months of age have been used in this computation; younger infants have been excluded.

It will be seen from Chart 5.1 that the total duration of breast-feeding was high at all three Centres. At the age of 12 months, more than 85% of infants in Bombay, more than 90% in Calcutta and more than 70% in Madras were still receiving breast milk. The mean 'total' durations were 10.4 months at Bombay, 10.5 months at Calcutta and 9.7 months at Madras. As pointed out earlier, if children beyond 12 months age are included, the mean duration will be longer.

Introduction of "supplementary" foods

The term "supplementary" food is used here to refer to foods given in addition to breast milk. There were 1142 infants at Bombay, 1028 at Calcutta and 1320 at Madras, who had been started on supplementary foods at the time of our Study. The reasons for starting supplementary foods as stated by the mothers are set out in Table 5.3. Additional data on the subject of supplementary foods are contained in the following sections of this Report.

Table 5.3—Reasons for starting supplementary foods for infants of all ages

Reasons	Percentage of infants		
	Bombay	Calcutta	Madras
Quantity of breast milk was not sufficient	72.7	80.3	92.4
Supplementary foods necessary for child's growth	2.5	10.8	1.5
Starting of supplementary foods would help weaning	11.8	10.3	1.4
Mother was advised to start supplementary foods	4.1	4.0	2.1
Breast milk did not suit the child	0.4	0.4	0.1
Some problem with breast	0.5	0.0	0.1
Child could not suck	0.6	0.3	0.5
Mother was pregnant	1.0	0.4	0.4
Illness of mother	0.8	0.4	0.2
Illness of child	0.1	–	–
Child should not trouble mother for breast-feeds	1.9	0.1	0.2
Mother is working	5.2	0.3	0.9
Mother is figure conscious	–	0.1	–
NR	5.1	5.1	0.7
Sample size (N)	1142	1028	1320

The percentages do not add up to 100.0 on account of multiple responses.

Completely weaned infants

As many as 201, 86 and 285 infants at Bombay, Calcutta and Madras respectively were not being breast-fed at the time of our interview. If we exclude 42, 26 and 54 'never-breast-fed' infants at Bombay, Calcutta and Madras respectively, there remain 159, 60 and 231 infants at these Centres respectively who were completely weaned after being breast-fed for at least some time.

Table 5.4 gives the details of the reasons advanced by mothers for complete weaning. For a majority of infants, breast-feeding was discontinued as the mother "had very little or no breast milk"; their percentages were 70, 60 and 79 at Bombay, Calcutta and Madras respectively. Some infants refused to suck at the breasts (10% at Bombay, 10% at Calcutta and 5% at Madras). About 3% to 6% infants' mothers gave up breast-feeding as they became pregnant again. Illness of mother was the reason given for 6% infants each at Bombay and Madras and for 12% at Calcutta. Child's illness was mentioned for quite a few (8%) infants at Calcutta. At Bombay, mother's work was mentioned for 13% infants, at Calcutta for 1.7% and at Madras for 1.3%. That she had to attend to a seriously-ill patient or that she was worried about her appearance, etc., were the other reasons given, but by only a very few mothers.

It will thus be seen that the mothers in this Study had their own "reasons" for prolonged (beyond 6 months) exclusive breast-feeding (Table 5.2), for introduction of supplements (Table 5.3) and for discontinuation of breast-feeding (Table 5.4). A major 'reason' in all these cases was the mother's own assessment of the adequacy (or lack of adequacy) of her breast milk and of the growth performance of her infant.

The percentage of completely weaned infants at different ages and at different Centres are indicated in Table 5.5.

Table 5.4—Reasons for discontinuation of breast-feeding

Reasons	Percentage of infants		
	Bombay	Calcutta	Madras
Mother had very little breast milk	69.8	60.0	79.2
Infant refused to suck	10.1	10.0	5.2
Mother was pregnant	6.3	5.0	3.5
Mother was ill	6.3	11.7	6.5
Child was ill	1.3	8.3	3.0
Mother was working	13.2	1.7	1.3
Doctor advised to discontinue breast-feeding	0.6	5.0	3.9
Others	–	5.0	1.3
NR	0.6	1.7	–
Sample size (N)	159	60	231

The percentages do not add up to 100.0 on account of multiple responses.

As is to be expected, the proportions of completely weaned infants increase with age; but what is striking is that even at the 7-12 month period, the proportion of infants *not* completely weaned is quite high in all Centres, especially in Madras.

Table 5.5 — Percentage of infants completely weaned at different ages and at different Centres

Age period	Percentage of infants		
	Bombay	Calcutta	Madras
Less than 3 months	0.7	2.1	2.8
4-6 months	7.1	3.5	3.1
7-12 months	13.4	6.6	3.5

The data to be presented in the next Chapter will indicate that in all Study Groups (a) a higher proportion of infants belonging to cities and semi-urban areas had been completely weaned at the time of the Study as compared to infants from small towns and rural areas (b) a much higher proportion of infants in the high income-group with per capita income of Rs. 201/- or more were completely weaned than those in the lower income groups, and (c) a much higher proportion of infants from families of higher educational status had been completely weaned than of infants from families with lower educational status. This may be a reflection of the "culture of affluence" on the one hand and the syndrome of poverty on the other rather than of education *per se*.

The percentage distribution of 'completely weaned' infants according to the duration for which they had been breast-fed is indicated in Table 5.6. About one third of the completely weaned infants at Bombay, half of them at Calcutta and one fourth of them at Madras were those who had been weaned within two months. This observation, seen in the light of the fact (Table 5.5) that only less than 3% of *all* infants below three months of age had been actually completely weaned, would indicate that complete weaning in the very early stages is not representative of the general pattern of infant-feeding practice. These early weaners may be considered to be composed of (a) very affluent groups who might have elected

Table 5.6—Percentage distribution according to duration of breast-feeding of completely weaned infants

Duration of breast-feeding (in months)	Percentage distribution of completely weaned infants		
	Bombay	Calcutta	Madras
0–2	30.2	46.7	25.5
3–4	22.0	25.0	29.9
4–6	29.6	20.0	24.3
7+	18.2	8.3	20.3
Total	100.0	100.0	100.0
Sample Size (N)	159	60	231

to wean for other reasons, and (b) a special group of poor mothers with relatively greater levels of inadequacy of breast milk output than the general run of mothers. Though these may not be considered "total lactation failures" like the mothers of the 'never-breast-fed' infants, they may be considered as instances of partial lactation failure.

In this Chapter, we have presented observations on breast-feeding practices—exclusive breast-feeding, introduction of supplements and total duration of lactation and time of complete weaning. The appropriateness of these practices has obviously to be judged in the light of the actual growth performance of the infants. In Chapter 9, where we present data on the growth of infants in the Study, we will comment on such questions as 'appropriate' duration of exclusive breast-feeding, introduction of supplements and time of weaning.

Chapter 6

Regional, Social, Economic and Cultural Characteristics related to Breast-feeding Practices

In Chapters 4 and 5, data on some specific aspects of breast-feeding were presented. In this Chapter, we attempt to present an overall comparative picture of breast-feeding practices as observed in the entire study population in all the three Centres.

Inter-regional differences: In Table 6.1 data on the profile of infant-feeding practices are presented for the three Centres. The Table includes information obtained through *recall* from mothers regarding the 'feeding status' of the infant within the first three weeks after birth, in addition to the data obtained through actual observations *at the time of interview* in infants of different age-groups. The former information has been included to provide an indication of how successful the initial establishment of lactation was. We may, for practical reasons, consider those mothers who could feed their infants exclusively on breast milk at least within the first three weeks after the infant's birth, as having established successful and satisfactory lactation.

On the basis of this criterion, 92% of mothers in Bombay, 88% in Calcutta and 96% in Madras had established successful and satisfactory lactation. The percentage in Calcutta was low enough to make a major contribution to the statistical significance of this inter-regional variation. In more than 5% of infants at Bombay and nearly 10% in Calcutta, supplementary foods (besides breast milk) were considered necessary even within three weeks after birth; but in Madras, the percentage of infants who needed such supplementary feeds at this stage was insignificant.

The percentage figures in Table 6.1 for infants within the first three weeks (obtained by recall) and those for the other age categories actually obtained at interview are not comparable since all infants in the Study are considered in the first case, and only those at the concerned specific age periods as the second. But inter-regional comparisons at different age-groups may be justified. In all three age-groups at the time of interview, the lactation performance of the mothers in Bombay appeared to be clearly superior to that of those in Calcutta and Madras. By six months, 44% of infants in Bombay were still being exclusively breast-fed, while the corresponding figures for Calcutta and Madras were 24% and 28% respectively. These inter-regional differences were statistically significant.

In all the Centres, the percentage of infants who were "completely weaned" (getting no breast milk) at the time of interview was strikingly greater in the big cities (of Bombay, Calcutta and Madras) and their immediate semi-urban vicinity than in the smaller towns or in the rural areas. This was so in all three age-groups (less than three months, four to six months, and more than six months) but the striking difference was naturally more appreciable when infants of older age-groups were considered (Tables 6.2, 6.3 and 6.4). The percentage of 'exclusively' breast-fed infants was higher (with some exceptions) in the rural areas and small towns than in the major cities and their immediate semi-urban environs.

Table 6.1 — Feeding status of infants

Infant's age	Sample Size (N)			Percentage distribution of infants by feeding status														
				B			BS			W			NB			NR		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
With in the first 3 weeks (from recall)	1820	1377	1729	92.1	88.4	96.0	5.4	9.7	0.9	–	–	–	2.3	1.9	3.1	0.2	–	–
At interview																		
Less than 3 months	435	387	428	76.6	48.5	59.1	20.9	47.3	35.3	0.7	2.1	2.8	1.6	2.1	2.8	0.2	–	–
4-6 months	465	368	387	44.1	23.9	27.9	46.2	71.2	60.7	7.1	3.5	8.3	1.9	1.4	3.1	0.7	–	–
7-12 months	920	622	914	17.4	11.6	6.1	66.4	79.7	70.0	13.4	6.6	20.4	2.8	2.1	3.5	–	–	–
0-12 months	1820	1377	1729	38.4	25.1	24.2	50.4	68.5	59.4	8.7	4.5	13.3	2.3	1.9	3.1	0.2	–	–

B – Exclusively breast-fed BS – Breast-fed and given supplementary food from the beginning W – Completely weaned, only substitute food given
NB – Never breast-fed NR – Not recorded
1. Bombay 2. Calcutta 3. Madras

Table 6.2 — Feeding status at interview of infants less than 3 months old in different Study Groups at the three Centres

	Sample Size (N)			Percentage distribution of infants by feeding status														
				B			BS			W			NB			NR		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Study Group																		
City	202	174	200	67.8	42.5	60.0	27.2	50.6	34.5	1.5	4.0	3.0	3.5	2.9	2.5	–	–	–
SU	56	14	23	66.1	64.3	52.2	32.1	35.7	39.1	–	–	4.3	–	–	4.3	1.8	–	–
R	22	62	56	77.3	59.7	53.6	22.7	38.7	41.1	–	–	–	–	1.6	5.4	–	–	–
T1	59	52	74	88.1	59.6	64.8	11.9	38.5	32.4	–	–	1.4	–	1.9	1.4	–	–	–
T2	96	85	75	93.8	43.5	57.3	6.2	54.1	34.7	–	1.2	5.3	–	1.2	2.7	–	–	–
Educational Status																		
High	65	44	46	67.7	31.8	43.5	29.2	63.6	50.0	1.5	2.3	4.3	1.5	2.3	2.2	–	–	–
Middle	107	73	112	72.9	27.4	60.7	25.2	65.8	30.4	0.9	5.5	5.4	0.9	1.4	3.6	–	–	–
Low	261	270	270	80.1	57.0	61.1	17.2	39.7	34.8	0.4	1.1	1.5	1.9	2.2	2.6	0.4	–	–
Per capita income per month (Rs.)																		
Less than 50	99	125	209	89.9	58.4	63.6	10.1	38.4	30.6	–	2.4	2.9	–	0.8	2.9	–	–	–
51-100	161	162	134	81.4	51.8	56.0	15.5	45.1	38.8	0.6	0.6	3.0	2.5	2.5	2.2	–	–	–
101-150	82	36	45	70.4	41.7	60.0	26.8	55.6	35.6	1.2	–	4.4	1.2	2.8	–	–	–	–
151-200	35	33	12	57.1	36.4	50.0	37.1	54.5	50.0	2.8	6.0	–	–	3.0	–	2.8	–	–
201 +	42	20	23	54.8	5.0	43.5	40.5	85.0	43.5	2.4	5.0	–	2.4	5.0	13.0	–	–	–
Place of delivery																		
Home	63	134	108	87.3	55.2	61.1	12.7	42.5	34.3	–	0.8	1.8	–	1.5	2.8	–	–	–
Govt. Hospital	261	201	242	77.8	51.2	62.4	19.5	49.3	31.0	0.4	1.5	3.7	1.9	2.5	2.9	0.4	–	–
Pvt. Hospital	109	50	76	67.0	22.0	46.1	29.4	68.0	50.0	1.8	8.0	1.3	1.8	2.0	2.6	–	–	–
Method of giving pre-lacteal feed																		
With bottle	68	27	–	69.0	18.5	–	26.5	77.8	–	1.5	3.7	–	1.5	–	–	1.5	–	–
With spoon	172	202	–	73.8	46.5	–	25.0	49.5	–	0.6	2.5	–	0.6	1.5	–	–	–	–
Others	116	18	–	83.6	38.9	–	12.9	55.6	–	0.9	–	–	2.6	5.5	–	–	–	–
No pre-lacteal feed	64	99	–	78.1	65.6	–	21.9	31.4	–	–	2.0	–	–	1.0	–	–	–	–

Categories	Sample Size (N)			Percentage distribution of infants by feeding status														
				B			BS			W			NB			NR		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Study Group																		
City	218	126	196	33.9	23.8	22.4	52.8	67.5	64.8	10.6	7.1	10.2	2.3	1.6	2.6	0.4	–	–
SU	43	11	19	41.9	27.3	31.6	39.5	72.7	63.2	14.0	–	–	2.3	–	5.2	2.3	–	–
R	23	81	60	30.4	25.9	35.0	65.3	70.4	56.7	–	2.5	8.3	4.3	1.2	–	–	–	–
T1	94	78	56	38.3	30.8	35.7	54.3	67.9	57.2	4.3	–	7.1	2.1	1.3	–	1.1	–	–
T2	87	72	56	80.5	13.9	33.9	19.5	81.9	53.6	–	2.8	5.4	–	1.4	7.1	–	–	–
Educational status																		
High	110	49	50	21.8	4.1	6.0	54.5	83.7	74.0	20.9	12.2	18.0	2.7	–	2.0	–	–	–
Middle	113	53	108	46.1	5.7	25.9	46.0	83.0	67.6	3.5	7.5	5.6	4.4	3.8	0.9	–	–	–
Low	241	265	228	53.6	31.3	34.2	42.3	66.5	54.8	2.5	1.1	7.5	0.4	1.1	3.5	1.2	–	–
Per capita income per month (Rs.)																		
Less than 50	78	126	158	70.5	27.8	34.2	26.9	71.4	56.3	–	–	6.3	2.6	0.8	3.2	–	–	–
51 - 100	160	148	123	53.1	27.7	29.3	43.7	66.2	61.8	0.6	4.7	5.7	1.3	1.4	3.2	1.3	–	–
101 - 150	85	45	45	37.6	9.0	22.2	48.2	84.4	68.9	9.4	4.4	6.7	3.5	2.2	2.2	1.2	–	–
151 - 200	54	24	30	24.1	12.5	20.0	68.5	83.3	70.0	7.4	4.2	10.0	–	–	–	–	–	–
201 +	69	14	28	15.9	7.1	10.7	56.5	64.3	57.2	26.1	21.4	32.1	1.4	7.1	–	–	–	–
Place of delivery																		
Home	96	156	99	56.2	38.5	37.4	41.3	59.6	57.6	1.0	0.6	4.0	–	1.3	1.0	1.0	–	–
Govt. Hospital	221	181	205	51.1	14.4	27.3	42.5	79.0	59.5	4.1	5.5	9.3	1.4	1.1	3.9	0.9	–	–
Pvt. Hospital	148	30	83	25.7	6.7	20.5	54.7	83.3	67.5	15.5	6.7	10.8	4.1	3.3	1.2	–	–	–
Method of giving pre-lacteal feed																		
Bottle-fed	92	18	–	32.6	16.7	–	43.5	77.8	–	17.4	5.5	–	6.5	–	–	–	–	–
Spoon-fed	169	204	–	40.8	22.0	–	53.9	73.5	–	4.1	2.5	–	–	2.0	–	1.2	–	–
Others	129	19	–	55.0	27.8	–	38.0	72.2	–	4.7	–	–	2.3	–	–	–	–	–
No pre-lacteal -feed	–	127	–	–	26.8	–	–	66.9	–	–	5.5	–	–	0.8	–	1.3	–	–

1. Bombay 2. Calcutta 3. Madras

B - Exclusively breast-fed BS - Supplementary foods given W - Completely weaned NB - Never breast-fed NR - Not recorded.

Table 6.4 — Feeding status at interview of infants more than six months old in different Study Groups at the three Centres.

Categories	Sample size (N)			Percentage distribution of older infants by feeding status											
				B			BS			W			NB		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Study Group															
City	416	167	419	13.9	10.2	2.9	63.0	73.0	69.4	18.5	14.4	23.2	4.6	2.4	4.5
S U	104	27	46	11.5	11.1	2.2	64.4	85.2	65.2	20.2	–	28.3	3.9	3.7	4.3
R	53	107	100	15.1	13.1	13.0	81.1	82.2	78.0	3.8	2.8	5.0	–	1.9	4.0
T 1	156	177	172	16.0	17.9	11.6	71.8	75.1	69.2	10.9	5.7	17.4	1.3	2.3	1.8
T 2	191	144	177	29.9	5.5	5.6	66.5	90.3	68.9	3.1	2.3	23.2	0.3	1.4	2.3
Educational Status															
High	206	90	142	4.9	2.2	–	58.2	63.3	61.3	32.5	26.7	35.9	4.4	7.8	2.8
Middle	240	116	280	13.3	4.3	3.2	72.5	84.5	68.6	12.5	8.6	24.6	1.7	2.6	3.6
Low	472	414	492	25.0	15.7	9.5	66.7	81.9	73.4	5.5	1.7	13.4	2.8	0.7	3.7
Per capita income per month (Rs.)															
Less than 50	149	207	328	28.2	16.4	12.5	69.8	80.2	73.2	2.0	2.9	10.4	–	0.5	3.9
51–100	328	236	317	22.3	10.6	2.5	68.9	82.6	73.8	7.0	4.7	20.9	1.8	2.1	2.8
101–150	190	73	124	13.7	9.6	1.6	74.7	78.1	67.7	8.4	8.2	27.5	3.2	4.1	3.2
151–200	111	40	64	10.8	5.0	–	56.8	80.0	65.6	27.0	10.0	29.7	5.4	5.0	4.7
201+	122	37	69	2.4	–	2.9	52.5	64.9	47.8	40.2	29.7	46.4	4.9	5.4	2.9
Place of delivery															
Home	171	200	251	28.1	20.5	10.0	64.3	76.0	69.3	5.8	3.0	16.7	1.8	0.5	4.0
Govt. Hospital	454	345	459	19.6	8.4	5.4	72.0	83.8	75.2	6.8	6.1	16.3	1.6	1.7	3.1
Pvt. Hospital	291	71	203	7.9	–	2.9	58.8	73.2	59.6	27.8	18.3	33.5	5.5	8.5	4.0
Method of pre-lacteal feed															
With bottle	185	19	–	6.0	10.5	–	63.8	63.2	–	25.4	21.0	–	4.8	5.3	–
With spoon	300	341	–	19.7	8.5	–	63.6	82.7	–	14.7	7.0	–	2.0	1.8	–
Others	266	23	–	18.8	–	–	75.2	95.6	–	4.9	–	–	1.1	4.4	–

Socio-cultural and economic aspects

In the course of the Study, extensive data on socio-cultural and economic factors related to breast-feeding practices were collected. The factors considered were house-hold income and per capita income, religion, caste, housing condition, family structure (nuclear, extended or joint), family size, presence of school-going siblings, educational status of family (of father and mother), occupational status of father and mother, maternal age, sex of infant and birth order. Considerations of space have prevented us from doing adequate justice in this Report to the wealth of data on socio-cultural and economic factors collected during the Study. Selected data which help to present a total general picture of infant-feeding practices in the communities studied have been set out in the several Tables included in this Chapter.

In interpreting the data, however, considerable caution would be necessary. There are some common overlapping attributes of what may be called the "poverty syndrome" – low income, low caste, poor housing, large family size, poor educational status, and occupation involving heavy manual work. It is the summation effect of these factors that may be considered to influence the infant-feeding practices. It is to be expected that the poorest sections of the population will naturally depend heavily on breast-feeding to sustain their infants; they will tend to introduce supplemental foods late; they will avoid complete weaning as long as possible. However, under the influence of other factors, these expectations may not always be borne out. We have tried to examine our data in the light of these broad considerations.

Income: The common trend in all Centres was that the better the economic status, the lower the percentage of infants less than three months old who were being exclusively breast-fed (Tables 6.2, 6.3 and 6.4). Thus among infants less than three months old belonging to families of the high income group (income more than Rs. 201/-. per capita per mensem), 55% in Bombay, 5% in Calcutta and 44% in Madras were being exclusively breast-fed. The corresponding figures for infants of the poorest income-group (less than Rs.50/- per capita per mensem) were 90% in Bombay, 58% in Calcutta and 64% in Madras. It is disturbing that as many as 10% of the poorest infants in Bombay, 42% in Calcutta and 36% in Madras were not being exclusively breast-fed for even up to three months.

Among infants more than six months old belonging to families with per capita income exceeding Rs. 201/- per mensem, 40% had been completely weaned in Bombay, 30% in Calcutta and 46% in Madras. The corresponding figures for the poorest income group were 2%, 3% and 10% respectively. Among infants more than six months old, belonging to the poorest income groups, 28% in Bombay, 16% in Calcutta and 13% in Madras were being exclusively breast-fed.

Religion and caste: Religion and caste, as such, or by themselves, did not seem to play an important role in influencing infant-feeding practices, though at Calcutta a higher proportion of muslim infants at all ages were exclusively breast-fed. A higher proportion of infants of the scheduled castes and tribes were on exclusive breast-feeding at all ages, as compared to the others; but in interpreting these findings, it must also be remembered that an overwhelming proportion of these subjects belonged to the poorer income-groups. The economic factor rather than 'religion' could have been the real determinant of these differences.

Housing: Similarly, a much higher proportion of infants of families of Calcutta and Madras in all age-groups *living in huts* were exclusively breast-fed, as compared to infants of families living in *chawls* (one-room tenement) and apartments. But what is more significant is that 23% of infants *less than three months of age* and living in huts in Bombay, 41% in Calcutta and 33% at Madras were already receiving either supplementary foods (in addition to breast milk) or had already been completely weaned away from the breast, receiving only 'substitute foods'. It is the fact that such high proportions of 'very young' infants are not being exclusively breast-fed for even three months that should cause concern.

Nuclear or Joint Family: The general expectation that a higher proportion of infants in 'extended' and joint families will be exclusively breast-fed for at least three months is also not borne out by our observations. It would be thought that extended and joint families would have provided some support to exclusive breast-feeding and that the mother-in-law would have ensured that her grand-child will be exclusively breast-fed at least for the first few months. In actual fact, there was no difference in the pattern as between nuclear families and joint families. Thus at Calcutta 54% of infants less than three months of age from nuclear families were being exclusively breast-fed as against only 37% of such infants from extended families and 45% from joint families. The differences were not significant in Bombay and Madras.

Family size: More infants from small-sized families at all the three Centres were exclusively breast-fed at least for the first three months than infants from larger families and crowded homes. This finding is in consonance with the finding reported in the earlier paragraphs. Apparently, the presence of too many members in the family inhibits frequent and exclusive breast-feeding.

School-going siblings: In Calcutta, it was found that in families where there was no school going sibling, the percentage of infants under three months who were exclusively breast-fed was greater (59%) than in families with one or more such siblings (34%-44%). This relationship was not noticed in Madras or Bombay. Here again, the fact that the number of non-school-going siblings is higher in very poor families has to be borne in mind in interpreting this finding.

Educational status: The higher the educational status of the family, of the father, mother or both, the lower the percentage of infants exclusively breast-fed for even up to three months. Again, since the better educated status was often associated with higher income, this relationship may not be directly attributable to education as such. The infants of 68% of educated mothers in Bombay, 32% in Calcutta and 44% in Madras were being exclusively breast-fed till they were three months old as against 80%, 57% and 61% i the corresponding poorly educated groups Among the better educated families, 33% of in fants at Bombay, 27% at Calcutta and 36% a Madras had been completely weaned after si months; the corresponding figures for families o low educational status were 6%, 7% and 13%.

These differences associated with social an economic status are important because the group with better education, belonging to more prestige ous professions and enjoying higher income are th trend-setters. The pattern of infant feeding prac tices observed among them portends the directio in which infant feeding practices will move, wit increased income-generation among the poor (un less corrective measures are instituted).

Mothers' working status: No significant dif ference related to this factor was observed as far a feeding pattern of infants less than three months o age was concerned. The conclusion is that at leas for a significant part of the first three months afte birth, most women, even working mothers, ha stayed away from their work. This factor mus have obscured any differences between mother working outside their homes and other mothers a least as far as the feeding of the less than three month-old infants was concerned.

On the other hand, in the feeding pattern o older infants, mothers' occupation did seem t have an important influence. Among infants o working mothers, 18% of infants less than si months old, and 20% of infants more than si months old had been completely weaned. The co responding figures for non-working mothers wer 6% and 13%.

Child's sex: There were no differences in th pattern of breast-feeding of boys and girls withi the first three months after birth. We studied poss ble sex-wise differences in as many as 57 differer socio-economic groups at all the three Centres "Significant" differences were obtained in onl five. They were infants:

(1) in families with a total income of Rs. 300

or less p.m. at Calcutta.

(2) in families with a total income of Rs. 501–1000 p.m. at Calcutta.

(3) in families with low education status at Calcutta.

(4) in 'extended' families at Calcutta, and

(5) in 'extended' families at Madras.

The 'advantage' in all groups except (2) above was with the girls. Our observations indicate that contrary to the general belief, there was no sex discrimination in infant-feeding practices.

Birth order: In Bombay, 13% of first-born infants were exclusively breast-fed beyond six months as against 23% of infants of birth order 4 and above. The corresponding figures in Calcutta were 7% and 19%. In Bombay, the proportion of infants beyond six months of age, who had been completely weaned was 19% as against 7% for infants of the same age-group belonging to birth order four and above. The corresponding figures in Calcutta were 9% and 4%.

Place of delivery: More infants born at home were exclusively breast-fed around birth and during early infancy than those born in Government hospitals and the number is still more in relation to those born in private hospitals. More infants born in hospitals (a higher number among those born in private hospitals) were completely weaned earlier than those born at home. In interpreting these findings it must again be remembered that infants born in hospitals (especially in private hospitals) belonged to the high income groups.

Milk foods in the feeding pattern: We grouped the feeding patterns on the basis of type of milk foods used – breast milk (B), animal milk (AM) and commercial milk (CM). These data are presented in Table 6.5.

In this Table, we have included the pattern of feeding milk foods only to infants of different age-groups. Foods other than milk foods which the infants would have been taking are not mentioned in this Table. These data would show that (a) in all income-groups breast-feeding performance was far superior in Bombay as compared to Calcutta and Madras. (b) Animal milk was preferred to CM as supplement to breast milk in all income-groups in Bombay but not in Calcutta and Madras, where especially among the higher income-groups, CM was the preferred supplement.

Concluding comments: Among the inter-regional differences in infant-feeding practices described in the foregoing pages, the findings which clearly stand out are: (1) that breast-feeding is more intensively practised in Bombay, than in Calcutta and Madras; (2) that the use of commercial infant foods is distinctly greater in Calcutta and Madras than in Bombay; and (3) that while animal milk (AM) was the outstandingly preferred (preferred to CM) supplement to breast milk in Bombay in *all* income-groups and at all age-periods, this *was so* in Calcutta and Madras only in the low income-groups. Families in higher income-groups in both Calcutta and Madras preferred commercial milk to animal milk. (Table 6.3). Elucidation of factors underlying these major differences may provide leads of practical value in promotion of better infant-feeding practices.

The distribution of population under study among different income-groups was somewhat different in Bombay from Calcutta and Madras, the proportion of poor income-groups in relation to the total population in the Centre being less in Bombay, than in Calcutta and Madras. But this factor cannot account for all the observed differences in infant-feeding practices between the Centres.

In *all* income-groups and in all Study Groups, the proportion of infants exclusively breast-fed for up to four months, six months or even longer was higher in Bombay than in Calcutta and Madras (Tables 6.2, 6.3 and 6.4). Also, in all income-groups, the proportion of infants receiving CM either alone or as supplement to breast milk was higher in Calcutta and Madras than in Bombay.

Table 6.5—Pattern of feeding different milk foods to infants of different age-groups by household income per month at the three Centres

Household income per month (Rs.)	Infants' age (in months)	Sample Size (N)			Percentage distribution of infants by feeding pattern of milk food*																							
					B			BAM			BCM			BAMCM			AM			AMCM			CM			Milk not given		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	3 Weeks	19	28	58	94.7	82.1	84.6	–	14.3	10.3	–	3.6	3.4	–	–	–	5.3	–	1.7	–	–	–	–	–	–	–	–	–
300	1–3	78	118	165	85.9	58.5	59.4	10.2	29.7	24.2	2.6	6.8	10.3	1.3	1.7	0.6	–	0.8	3.0	–	–	0.6	–	2.5	1.8	–	–	–
	4–6	80	144	188	68.8	54.2	46.8	27.5	25.7	26.6	2.5	16.0	17.6	–	2.1	1.6	1.2	2.1	4.8	–	–	0.5	–	–	2.1	–	–	–
	7+	158	218	415	56.3	40.4	38.6	35.4	42.2	29.9	3.2	14.7	14.9	0.6	0.9	0.7	3.8	1.4	7.9	–	–	0.5	0.6	0.5	7.0	–	–	0.5
	3 Weeks	18	18	20	94.4	88.8	75.0	5.6	–	15.0	–	5.6	10.0	–	–	–	–	–	–	–	–	–	–	5.6	–	–	–	–
301–500	1–3	91	89	71	76.9	55.1	60.6	16.5	24.7	8.4	3.4	15.7	26.8	1.1	3.4	–	1.1	–	1.4	–	–	–	–	1.1	2.8	–	–	–
	4–6	122	91	78	61.5	41.8	37.2	27.9	33.0	20.5	9.0	16.5	33.3	–	4.4	2.6	1.6	1.1	2.6	–	–	–	–	2.2	3.8	–	1.1	–
	7+	241	192	212	44.4	22.4	20.3	41.1	37.5	29.2	5.4	21.9	26.4	–	10.9	1.9	5.4	1.6	8.0	0.4	2.6	3.3	3.3	3.1	9.9	–	–	0.9
	3 Weeks	22	14	15	100.0	71.5	86.7	–	–	–	–	14.3	13.3	–	–	–	–	7.1	–	–	–	–	–	7.1	–	–	–	–
501–1000	1–3	129	71	71	72.8	32.4	43.7	16.3	18.3	18.3	8.5	38.0	22.5	–	8.4	1.4	0.8	–	1.4	–	–	–	1.6	2.8	12.7	–	–	–
	4–6	164	97	72	42.1	16.5	34.7	37.9	29.9	15.3	10.4	30.9	34.7	0.6	17.5	1.4	4.9	1.0	4.2	–	3.1	2.8	4.3	1.0	6.9	–	–	–
	7+	323	130	188	29.7	12.3	12.8	47.4	33.8	21.2	7.1	20.8	27.7	0.6	21.5	3.2	11.8	–	8.0	0.9	4.6	6.4	2.5	6.9	20.2	–	–	0.5
	3 Weeks	11	5	4	81.8	80.0	50.0	18.2	–	25.0	–	20.0	25.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1001+	1–3	53	33	21	52.8	6.1	42.9	22.6	9.1	14.3	15.1	54.5	38.1	–	21.2	4.8	–	–	–	–	3.0	–	–	6.1	–	–	–	–
	4–6	85	26	46	31.8	11.5	23.9	31.8	11.5	15.2	10.5	30.8	39.1	–	30.8	2.2	16.5	–	4.3	1.2	3.9	6.5	8.2	11.5	8.7	-	-	-
	7+	180	54	93	13.9	1.9	11.8	41.2	5.6	15.1	7.8	37.0	25.8	1.1	33.3	4.3	29.4	–	9.7	2.2	18.5	2.2	4.4	3.7	19.4	–	–	1.1

1. Bombay 2. Calcutta 3. Madras

** These infants were also given other foods apart from milk foods mentioned in the Table.*

B : Breast Milk AM : Animal Milk CM : Commercial Milk.

The *variability* in the lactation performance of mothers in poor income-groups in Calcutta and Madras is a rather intriguing phenomenon. This variability may partly explain the differences in the nutritional status of pre-school children – all belonging to the same socio-economic group and living in the same environment. Nutrition scientists have for long been intrigued by such differences, which could not be related to the actual diets the children were getting. Apparently there are differences within the same poor group with respect to the duration for which the infant is exclusively breast-fed, the time at which supplement is introduced and the time when the infant is completely weaned. At least this would appear to be the case in Calcutta and Madras. Further studies are needed to investigate the impact of variations in feeding practices during infancy on the nutritional status of the child in early childhood.

On the one hand, among the poorest families in Calcutta and Madras, as many as 42% and 30% of infants respectively were not being exclusively breast-fed, for even three months; on the other hand, exclusive breast-feeding (without any supplements whatsoever) was being continued well beyond six months in the case of 16% of infants of the poorest income-groups in Calcutta and 13% in Madras. In Bombay where the lactation performance was uniformly superior, 90% of infants of the poorest income-group were exclusively breast-fed for three months; exclusive breast-feeding beyond 6 months was practised in 28% of infants of the same income-group.

The distinctly better lactation performance at Bombay needs explanation. Studies carried out at the National Institute of Nutrition (cited in the Bibliography) had shown that better diets can improve the quantity of milk (though not necessarily the protein quality) and the concentration of some vitamins. In this Study, we have not collected precise quantitative data on the dietary intake and nutritional status of mothers. Therefore, the question whether observed differences in lactation performance between the Centres may be determined by differences in the nutritional status of mothers can only be speculated upon.

Other possible determinants of infant-feeding practices:

Apart from socio-cultural and economic factors discussed earlier, two factors which are often mentioned as possible major determinants of infant-feeding practices are (1) advice offered by health personnel, and (2) occupational staus of the mother. It is widely believed that health personnel play a major role in influencing infant-feeding practices and that breast-feeding is often hampered and its duration cut short because the mother has to go out to work. 'Development' will imply an increasing role of health personnel and increasing employment opportunities for women. It is, therefore, important to know how these factors are now operating in influencing infant-feeding practices.

Advice from health personnel: Four broad types of advice regarding infant-feeding may be recognised: (1) continue breast feeding for as long as possible; (2) continue breast feeding for as long as possible but introduce supplements at a certain point of time; (3) stop breast-feeding at the age of 4/6 months and start supplements thereafter; and (4) give only supplements right from the beginning. (Table 6.6) The first two advices are in conformity with what is generally considered as wholesome infant-feeding practice; the latter two are not, the last one particularly being the most undesirable.

Table 6.6 — Advice on infant-feeding

Type of advice	Percentages of infants		
	Bombay	Calcutta	Madras
1	12.3	2.3	0.7
2	21.4	27.8	26.8
3	0.7	0.3	1.5
4	1.0	1.7	1.3
No advice	67.7	67.9	69.9
NR	–	0.3	–
Sample size (N)	1820	1377	1729

Percentages do not add up to 100.0 on account of multiple responses.

Our observations on the Study are indicated here. The two most outstanding points that emerge are: (1) that a great majority of mothers (67% to 70%) receive no advice whatsoever, and (2) advice 3 and 4 put together was given to just one to three percent of all mothers in the Study. If we 'break up' the mothers receiving advice into different income groups, we find that only 13% to 16% of mothers belonging to the poorest income-groups receive any advice (the proportion being greater among the affluent), and of these, those that receive advice 3 and 4 constitute a minor fraction of all poor mothers in the Study. All this is in keeping with the fact that the outreach of our health services is at present very poor; and the poorest sections are often not touched. Even such of the poor as find access to health personnel do so for getting treatment of some pressing complaints and not for seeking advice on rearing of their children. It is mostly the 'elitist' and educated segments of the population that get the advice and not the poor and the illiterate.

We found in our Study that such advice which mothers had received was not always given by the health personnel. In fact, nearly in 20% to 30% of those who received any advice, the advice came from other family members and relatives and not from doctors and health personel. Thus the role of the health personnel in directly influencing infant-feeding practices among the poor was even less than what the data in Table 6.6 would suggest. We may be exaggerating the role of health personnel in influencing infant-feeding practices among the poor. At present such influence, as they may have with respect to infant feeding practices, is mostly confined to the affluent sections.

In a great majority of cases in which they offered advice, health personnel apparently did advise the continuation of breast-feeding for as long as possible. However, it cannot be denied that *in a small proportion of cases* they did actively promote and encourage the use of CM/CC, and such promotion was unfortunately not limited to the affluent sections only. In charts 8.1 and 8.2 we have provided data on number of mothers advised to use CM/CC. These charts pertain to all income-groups and most of those receiving advice presumably belonged mostly to the affluent sections. Doctors in Calcutta and Madras, more often than those in Bombay, advised mothers (including the poor ones) to use CM/CC in preference to animal milk. The reasons for such advice on the part of health personnel are not clear. We had also already pointed out the high prevalence of CM/CC use among infants delivered in private and Government hospitals.

What was specially disconcerting was that in the few cases in which health personnel advised poor mothers to use CM/CC, such advice was not accompanied by clear instructions as to how the food was to be reconstituted and what care and precautions had to be taken. We also found that in some cases at Calcutta, doctors had actually advised overdilution of milk formula foods.

At present, because of the poor outreach of our health services, the number of children of poor income-groups actually affected or influenced by advice from doctors and health personnel is very small and represents only a very minor fraction of infants in the community. Since we hope to improve the outreach of our health services in the years ahead, we may expect that more and more poor families will come into contact with health personnel. It is, therefore, important that health personnel inlcluding those in the lowest echelons of the health services who will be actually doing the domiciliary visits, should be properly educated and motivated with regard to promotion of wholesome infant-feeding practices. We did not find in our Study any evidence that health personnel advised any mothers of the poor income-groups as to how best the inexpensive food items in their habitual dietaries could be used as supplements to breast milk in late infancy. The major reason for this may well be that the health personnel themselves did not have the necessary knowledge in this regard.

Mother's occupational status: Mother's occupational status did influence the infant-feeding pattern. Nearly 19% of mothers in Bombay and around 5% of mothers in Calcutta and Madras were either full time, part-time or seasonal workers. The pattern in Bombay may provide an indication of how working mothers cope with the problem of feeding their infants. Of 224 full-time

working mothers in our Study in Bombay, 30 had not resumed duties, some of them being still on "maternity leave"; 64 mothers took their infants to their work place; 11 affluent mothers had employed a servant and 11 others utilised the services of a creche. The rest left their infants at home to be cared for by their family members or neighbours. In a considerable proportion of these latter cases, the infants were in the care of children less than 10 years old and of boys and girls less than 15 years of age. These family members looked after the infant for about five hours in the day or even longer, and quite a few of such infants were getting only breast milk. Thus while the mother was at work for 5 to 6 hours in the day, these infants received no feed. Other infants who were getting supplements were fed by the family members with food which the mothers had prepared before going out for work. There were quite a few cases where young children actually prepared the food for the infants and fed them.

Many mothers who were working and whose infants were solely on breast milk did complain that their work interfered with breast-feeding but they had not given up nor did they indicate any intention of giving up. Some mothers felt that they were managing quite well with their work as well as breast-feeding their infants, and did not consider the work as an interference. A small number had decided to give up breast-feeding on account of the problems of their occupation; but these same mothers who were thus giving up indicated that they would not be prepared to continue breast-feeding even if facilities were made available for breast-feeding at work sites. Apparently, here again the factor of motivation appeared to be the major determinant.

Chapter 7

Use of Foods other than Commercial Infant Foods

Apart from commercial infant foods which we shall discuss in the next Chapter, other foods used as 'supplementary' or 'substitute' foods for infant feeding are: animal milk, cereals, pulses *(dhal)*, vegetables, fruits, eggs, meat and fish. Of these, the most important and the most widely used, especially in early infancy is animal milk. Among the processed foods (other than CM and CC) used in infant-feeding, biscuits of various kinds also find an important place. In this Chapter, we present the observations regarding the use of these food items.

Animal milk: Animal milk is given either (a) as 'top feed' immediately following a breast-feed, (b) as an ingredient for the reconstitution of CM or CC, generally diluted with water, or (c) as the sole single feed one or more times in the day.

Of the 1142 infants at the Bombay Centre who were receiving either 'supplementary' or 'substitute' food, animal milk was given to 814 (71%); of the 1028 at Calcutta, 611 (59%) and of the 1320 at Madras, 620 (47%) received animal milk (Table 7.1). Thus animal milk was much more widely used at Bombay than at Calcutta and Madras. The differences in the percentages of infants receiving animal milk at the three Centres given above do not fully reflect the magnitude of the differences in the use of animal milk between the three Centres. We estimate that differences in the actual amounts of animal milk received by infants at the three Centres were far greater. Among the infants receiving animal milk, the milk was introduced within the first month after birth in 14% of cases at Bombay, 9% at Calcutta and 3% at Madras. In cases where animal milk was being given as the sole single feed, the volume of milk per feed could be considered adequate in 42% of of infants at Bombay, but only in 9% of infants at Calcutta and 7% at Madras. In estimating the adequacy of

Table 7.1 — Percentage distribution of infants according to age when they started receiving animal milk

Centres	Percentage distribution of infants getting AM by age at starting (in months)						
	Less than one month	1-3	4-6	7+	Total	Sample size (N)	% of N to infants on supplementary and substitute foods
Bombay	14.2	20.1	53.2	12.5	100.0	814	7
Calcutta	9.2	43.4	39.8	7.6	100.0	611	5
Madras	3.4	35.2	44.8	16.6	100.0	620	4

volume per feed we have followed the scale indicated below:

Table 7.2—Yardstick of adequacy of volume per feed

Infant's age	Recommended volume of milk per feed (ml)
Less than one month	50–75
1–2 months	75–100
2–4 months	100–125
4–6 months	150–175
More than 6 months	175–200

The practice of not diluting the milk was followed in the case of nearly 31% of infants at Bombay Centre but only in about 19% in Calcutta and Madras Centres. Only 5.4% of infants receiving animal milk were receiving undiluted boiled milk at Bombay, 1.6% at Calcutta and 4.2% at Madras. These infants presumably belonged to the highest-income groups. In all other low income-groups, milk, though invariably boiled, was always diluted, the degree of dilution varying considerably.

Thus the fact that animal milk is used far more extensively and intensively in infant-feeding at Bombay than at Calcutta and Madras stands out clearly. We believe that this could be a major reason for the reverse situation with respect to the use of CM in the three Centres.

We believe that the wider and greater use of animal milk at Bombay could be related to the relatively greater availability of fresh, good quality animal milk at reasonable prices at Bombay as compared to Calcutta and Madras.

A salutary feature with respect to the use of animal milk is the fact that animal milk, according to Indian tradition and culture, is almost always boiled before use; this practice obtains among all income-groups. In this Study, we noticed that milk was boiled before use in practically all cases of infants at Bombay, in nearly 97% of cases at Calcutta and over 98% of cases in Madras.

Unlike in the case of commercial infant foods which were used in much higher proportion by high income-groups than by the low income-groups, in the case of animal milk the differences in the extent of its use as between the different income-groups were minimal. Thus nearly 70% of infants from house-holds at Bombay with monthly income of less than Rs. 300/-, 57% at Calcutta and 54% at Madras were receiving animal milk. The corresponding figures for infants from house-holds with monthly incomes exceeding Rs. 1000/- were 76%, 54% and 36% respectively.

At the time of our Study, out of 4926 infants in all Centres and Study Groups, 1955 were receiving animal milk, either with breast milk, with other foods or exclusively; these infants were not receiving any commercial infant foods. On the other hand, there were 1531 infants who were receiving commercial infant foods, either with breast milk as with other foods or exclusively. Thus, it would appear that as between animal milk and commercial infant foods, the former was still the major supplement of choice among the poor. Taking all centres together as at present, animal milk has only a small edge over commercial infant foods. CM is apparently running neck and neck with animal milk. It is quite possible that, if present trends continue, commercial infant foods may, before long, overtake animal milk to become the leading supplement of choice. On the other hand with special efforts and with better availability of fresh animal milk at Calcutta and Madras, the use of animal milk at these Centres could increase substantially and that of commercial infant foods could diminish to levels now obtaining at Bombay but this can come about only if the current trends are reversed. The great advantage of fresh animal milk is that, as mentioned earlier, it is always boiled before use, for equivalent amounts it is less expensive than CM, and problems of contamination incidental to storage under unhygienic conditions will be reduced.

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Other Foods: In Table 7.3, we have provided data with regard to the use of different foods (other than commercial infant foods and animal milk). In Table 7.4, we have indicated the age of the infant at which the different foods were started.

Cereals, pulses *(dhal)* and biscuits were commonly used for infants at Bombay and Madras. The low use of cereals and pulses *(dhal)* at Calcutta may be due to the fact that 'barley' (pearl millet) and Sotti (arrowroot paste) were being widely used instead. Fruits were used for 27% of infants in Bombay, for 11% in Calcutta , but for only 7% in Madras. In fact, the use of fruits as special food for nursing mothers also was more evident at Calcutta (12%) and at Bombay (9%) than in Madras where it was negligible. Vegetables, especially leafy vegetables, were not widely used, the highest percentage of infants getting these being at Madras (9%). Expensive non-vegetarian foods like eggs, meat and fish, were used by a very small number, about 5% of infants, mostly belonging to the high income-groups. Biscuits were being used fairly widely for feeding infants at Bombay (37%) and Madras (49%), but not at Calcutta.

Cereals were started for about one fourth of the infants and pulses *(dhal)* for about one fifth, when the infant was between 3-6 months old. About one third of infants received cereals and an equal proportion of pulses *(dhal)* as well after six months. In Tables 7.5, 7.6 and 7.7, we have set out information regarding the age at which the different foods were introduced at the three Centres.

The higher the socio-economic status, the greater was the use of cereals, pulses *(dhal)* and fruits at all Centres. Fruits in particular were prestigeous foods which the elite alone could apparently afford. On the other hand, the use of biscuits for infant feeding was widely prevalent among the poor, especially at Bombay and Madras. A high proportion of infants from families of low income-groups and the underprivileged sections received biscuits. Thus at Bombay nearly 31% of infants belonging to families with per capita/monthly income of less than Rs. 50/- received biscuits as against 19% of infants of families with per capita/monthly income of over Rs. 200/-. More than a third of infants receiving biscuits were Harijans (Scheduled Caste). At Madras, the proportions of infants of the lowest income-group (less than Rs. 50/- per capita/per month) and of the highest income-group (more than Rs.200/- per capita/per month) receiving biscuits were nearly the same (45%). More than 50% of infants of the Harijans (Scheduled Castes) were taking biscuits, and generally infants of working mothers received these more often than those of non-working mothers.

Table 7.3 — Use of different foods among infants getting supplementary or substitute foods

Food items	Percentage of infants given the foods		
	Bombay	Calcutta	Madras
Cereals	42.1	15.7	43.7
Pulses	33.0	6.1	38.4
Vegetables	5.1	9.5	9.0
Leafy vegetables	1.4	3.6	9.2
Fruits	27.2	10.7	7.3
Fats	7.0	0.6	5.2
Eggs	5.9	3.6	3.4
Meat, Fish, etc.	3.5	5.9	2.1
Biscuits	37.4	2.4	48.6

Only those infants given supplementary or substitute foods are selected for comparing percentages.

Table 7.4 — Age at starting different foods

Food item and Centre	Percentage distribution of infants given food by age at starting (in months)						Sample size (N)	% of N to infants on supplementary and substitute foods taken together
	0-2	3-6	7-8	9-12	NR	Total		
Cereals								
Bombay	0.8	22.7	35.3	40.1	1.1	100.0	481	42.1
Calcutta	6.2	23.5	46.9	22.8	0.6	100.0	162	15.8
Madras	0.9	24.7	34.5	39.6	0.3	100.0	579	43.9
Pulses								
Bombay	1.1	22.5	35.8	40.1	0.5	100.0	377	33.0
Calcutta	–	17.5	46.0	36.5	–	100.0	63	6.1
Madras	–	20.0	36.0	43.6	0.4	100.0	509	38.6
Fruits								
Bombay	1.6	42.0	27.4	29.0	–	100.0	310	27.1
Calcutta	12.8	65.1	14.8	7.3	–	100.0	109	10.6
Madras	4.1	36.1	26.8	33.0	–	100.0	97	7.3
Biscuits								
Bombay	0.3	36.9	34.6	24.6	3.6	100.0	424	37.1
Calcutta	4.0	36.0	8.0	4.0	48.0	100.0	25	2.4
Madras	0.5	62.2	23.6	13.4	0.3	100.0	641	48.6
Vegetables								
Bombay	1.7	48.3	22.4	22.4	5.2	100.0	58	5.1
Calcutta	–	24.5	52.0	23.5	–	100.0	98	9.5
Madras	–	17.4	28.1	52.9	1.6	100.0	121	9.2
Leafy Vegetables								
Bombay	–	62.6	25.0	6.2	6.2	100.0	16	1.4
Calcutta	–	32.5	45.9	21.6	–	100.0	37	3.6
Madras	–	17.9	29.3	51.2	1.6	100.0	123	9.3
Eggs								
Bombay	–	35.8	26.9	37.3	–	100.0	67	5.9
Calcutta	–	30.6	38.8	27.8	2.8	100.0	36	10.6
Madras	–	19.6	30.4	50.0	–	100.0	46	3.5
Meat, Fish, etc.								
Bombay	–	27.5	32.5	35.0	5.0	100.0	40	3.5
Calcutta	–	22.9	42.7	32.8	1.6	100.0	61	5.9
Madras	–	21.4	10.7	67.9	–	100.0	28	2.1

1. The percentage figures pertain to only those infants receiving the particular item of food at the time of Study.

2. The numbers of infants on supplementary and substitute foods taken together were 1142 at Bombay, 1028 at Calcutta and 1320 at Madras

3. NR Not recorded.

Table 7.5 — Age at starting different food items — Bombay

Infant's age in months	Percentage distribution of infants on supplementary foods taken together by age at starting											
	AM	CM	CC	C	Pulses	Vegetables	Leafy vegetables	Fruits	Fats	Eggs	Meat, fish etc.	Biscuits
0	10.1	4.5	–	0.1	–	–	–	0.2	–	–	–	–
1	6.3	3.1	0.2	0.2	–	–	–	–	–	–	–	–
2	8.0	4.0	0.7	0.1	0.3	0.1	–	0.3	–	–	–	0.1
3–4	22.4	7.1	14.8	2.0	2.0	1.3	0.4	4.6	0.4	0.5	0.1	2.7
5–6	15.5	2.1	5.7	7.5	5.4	1.1	0.5	6.8	1.2	1.6	0.9	7.3
7–8	5.2	1.1	2.0	14.9	11.9	1.1	0.4	7.4	2.7	1.6	1.1	9.4
9–10	2.7	0.3	0.8	12.1	9.0	1.1	0.1	5.4	1.9	1.5	0.7	5.3
11–12	1.0	0.4	0.3	4.9	4.2	0.1	–	2.5	0.8	0.7	0.5	1.3
Not started	28.4	77.3	75.5	57.8	67.0	94.9	98.5	72.8	93.0	94.1	96.5	62.9
NR	0.4	0.1	–	0.4	0.2	0.3	0.1	–	–	–	0.2	11.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Sample size (N)	1142	1142	1142	1142	1142	1142	1142	1142	1142	1142	1142	1142

AM–Animal milk *CM–Commercial milk* *CC–Commercial cereals* *C–cereals other than commercial cereal food* *NR–Not recorded*

Table 7.6 — Age at starting different food items — Calcutta

Infant's age in months	Percentage distribution of infants on supplementary foods taken together by age at starting											
	AM	CM	CC	C	Pulses	Vegetables	Leafy vegetables	Fruits	Fats	Eggs	Meat, fish etc.	Biscuits
0	5.4	9.9	–	0.3	–	–	–	–	–	–	–	0.1
1	15.2	11.8	0.3	0.1	–	–	–	0.7	–	–	–	–
2	10.6	8.6	0.3	0.6	–	–	–	0.7	–	–	–	–
3-4	15.9	11.2	7.3	0.8	0.2	0.2	–	3.0	–	0.1	–	0.3
5-6	7.8	4.6	4.3	2.9	0.9	2.1	1.2	3.9	0.2	1.0	1.4	0.6
7-8	3.4	1.8	1.0	7.4	2.8	5.0	1.6	1.6	0.3	1.4	2.5	0.2
9-10	0.9	0.3	0.6	3.1	1.8	1.9	0.7	0.7	0.1	0.8	1.5	0.1
11-12	0.3	0.2	–	0.5	0.4	0.3	0.1	0.1	–	0.2	0.5	–
Not started	40.1	51.4	86.0	84.2	93.9	90.5	96.4	89.3	99.4	96.4	94.0	97.5
NR	0.4	0.2	0.2	0.1	–	–	–	–	–	0.1	0.1	1.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Sample Size(N)	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028	1028

AM–Animal Milk CM–Commercial Milk CC–Commercial Cereals C–Cereals other than commercial cereal food NR–Not recorded.

Table 7.7 — Age at starting different food items — Madras

Infant's age in months	Percentage distribution of infants on supplementary foods taken together by age at starting											
	AM	CM	CC	C	Pulses	Vegetables	Leafy vegetables	Fruits	Fats	Eggs	Meat, fish etc.	Biscuits
0	1.6	2.7	0.1	–	–	–	–	–	–	–	–	–
1	11.3	10.6	0.1	0.2	–	–	–	–	–	–	–	–
2	5.2	7.1	0.4	0.2	–	–	–	0.3	–	–	–	0.2
3-4	13.1	24.0	15.3	1.9	0.7	0.1	0.1	1.2	–	0.2	–	9.4
5-6	7.8	7.4	11.1	8.9	7.0	1.6	1.6	1.4	0.5	0.5	0.4	20.8
7-8	4.4	2.1	3.2	15.2	13.9	2.6	2.8	1.9	1.9	1.0	0.2	11.5
9-10	2.7	1.4	0.9	12.9	12.8	3.9	3.8	1.8	2.2	1.0	0.9	5.4
11-12	0.8	0.2	–	4.4	4.1	0.9	0.9	0.7	0.6	0.7	0.6	1.1
Not started	52.9	44.4	68.9	56.1	61.4	90.8	90.7	92.7	94.8	96.6	97.9	51.4
NR	0.2	0.1	–	0.2	0.1	0.1	0.1	–	–	–	–	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Sample size (N)	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320

We draw pointed attention to the wide use of biscuits among poor infants at Bombay and Madras, as we consider that this practice can be exploited for the improvement of infant nutrition especially among the poor, by ensuring the availability of inexpensive biscuits of good nutritive value. This is an aspect which has not attracted the attention it deserves in nutrition intervention programmes.

The foods (other than commercial infant foods and animal milk) discussed above were, of course, not used singly but always in some combination. The most frequent combination was cereals and pulses *(dhal)* (35% at Madras and 31% at Bombay), cereals and biscuits (31% at Madras and 23% at Bombay). Meat, fish and eggs were used only in less than 5% of infants – all of them belonging to the highest income-group.

Expenditure on "special foods" for infants: By "special foods" here, we mean all those food items specially purchased for the infant alone – such as animal milk, CM, CC, fruits and biscuits. These do *not* include foods like cereals, pulses *(dhal)* and vegetables which were also being given to the infants but which formed a part of the regular family diet not specially prepared for the use of infants alone.

It was found that nearly 37% of families with monthly house-hold income of less than Rs. 300/- were spending more than 10% of their income on "special foods" for their infants at Bombay, nearly 45% at Calcutta and 51% at Madras. The corresponding figures for families of this income group who were spending more than 16% of their income on such foods were nearly 24% at Bombay, 22% at Calcutta and 27% at Madras. The economic implications of these figures hardly need emphasis.

Only about 17% of infants of the poorest income-group (house-hold income less than Rs. 300 per mensem) at Bombay, 4% at Calcutta , and over 8% at Madras did not receive any special foods.

In the above discussion, we have included among "special foods" not only CM and CC but also animal milk, fruits and biscuits. The figures for expenditure mentioned above have, therefore been arrived at after the inclusion of infants *not* receiving CM and CC also; for this reason these figures may be an underestimation of the expenditure incurred on CM and CC by such of those families whose infants are using these commercial infant foods. We will see in the next Chapter that among poor families with house-hold incomes of less than Rs. 300/- per mensem using commercial infant foods, the expenditure on such commercial infant foods *alone* exceeded 10% of household income in the case of 27% of such families at Bombay and 65% of such families at Madras and Calcutta. It will thus be seen that expense on commercial infant foods accounts for the lion's share of the overall expenditure on "special foods" by poor families.

Chapter 8

Use of Commercial Infant Foods

The term "Commercial Infant Foods" is used in this Report to include foods commercially prepared and marketed specially as infant foods. These foods are considered here under two broad categories: Commercial Milk Foods (CM) and Commercial Cereal Foods (CC). We have deliberately avoided references to individual brands in this Report.

Commercial Milk Food

Regional and locational differences: Of all infants investigated in the three Centres, it was found that 14% of infants at the Bombay Centre, 36% of infants at the Calcutta Centre and 42% of infants at the Madras Centre were getting CM at some time or the other.

In Chapter 7 it had been pointed out that 1142, 1028 and 1320 infants at Bombay Centre, Calcutta Centre and Madras Centre respectively, were receiving foods other than breast milk either as 'supplements' or 'substitutes'. Among such infants, 23% in Bombay, 48% in Calcutta and 56% in Madras were receiving CM. Thus CM was used as 'supplement' or 'substitute' in one of every four infants in the Bombay Centre; in Calcutta and Madras, almost every alternate infant receiving any 'supplement' or 'substitute' at all, was getting CM. The difference between the Centres in this regard was significant.

Within each Centre the use of CM was highest in the metropolitan city and lowest in the rural environs; however, the order of the urban-rural difference varied from Centre to Centre, being leas at Bombay and maximal at Calcutta (Table 8.1) Thus at the Bombay Centre, 28% of infants in the metropolis and 22% of infants in the rural environ were receiving CM; in Calcutta, the correspondin figures were 70% and 26%, and in Madras 68% and 36%. The semi-urban area in the immediat vicinity of the metropolis presented a picture al most similar to the metropolitan city as far as Bom bay and Madras were concerned. The use of CM i the towns (T1 and T2) of the Calcutta and Madra Centres was significantly less than in the met ropolis but more than in the rural environs of th metropolis. On the other hand, the use of CM i the towns studied at the Bombay Centre was sur prisingly low, indeed even lower than in the rura environs of the Bombay metropolis.

The fact that 22% to 36% of infants in the vil lages around the metropolitan cities were receivin CM would show that the use of commercial infan foods is by no means confined to the big cities bu has extended to their rural environs as well, in sig nificant measure. It must, however, be pointed ou that the villages investigated in this Study wer within a radius of 5 Km to 15 Km of the metropolis Though they were generally inhabited by the poo sections of the population, they cannot be cons dered as representative of remote rural areas of th country far away from the cities and with poo transport and communication facilities. The f gures for the usage of CM in the villages studie here cannot, therefore, be extrapolated as applica ble to all rural areas of the country.

The use of CM was not only much less on th

Table 8.1 — Socio-economic profile of infants given CM in different Study Groups at the three Centres

Category	Percentage of infants given C M		
	Bombay	Calcutta	Madras
Study Groups			
City	28.3	70.1	68.3
S U	28.5	29.7	60.0
R	22.1	26.3	36.4
T 1	11.2	41.9	44.0
T 2	11.1	43.3	42.8
Type of dwelling			
Hut	22.6	18.3	37.4
Chawl	20.8	58.4	64.4
Apartment or independent house.	26.1	58.1	65.9
Type of family			
Nuclear	18.8	38.3	53.1
Extended	24.8	52.9	54.0
Joint	26.4	61.7	63.2
Per capita income per month (Rs.)			
50 or less	8.9	24.5	37.4
51 – 100	21.1	48.2	60.8
101 – 150	24.1	66.4	65.9
151 – 200	25.7	77.2	80.0
201 +	30.5	92.9	75.0
Mother's education			
No education	19.4	26.1	33.6
Low	19.5	46.7	51.3
High	27.2	77.5	70.9
Mother's activity status			
Worker	23.5	63.6	–
Non-worker	22.7	48.8	–
Child's birth order			
First	31.0	61.7	62.4
Second or third	20.8	47.1	58.9
Fourth or above	14.5	32.4	42.4
Child's sex			
Boy	22.7	48.4	54.5
Girl	22.4	48.5	56.6
Place of delivery			
Home	15.1	23.2	39.2
Govt. Hospital	22.4	54.0	59.5
Pvt. Hospital	25.8	81.3	65.1

SU : Semi Urban, R : Rural, T 1 : Town with population of 50,000 – 99,999. T 2 : Town with population of 20,000 to 49,999.
C M : Commercial Milk Food

whole at the Bombay Centre than at the Calcutta and Madras Centres; it was also much less in all Study Groups within the Bombay Centre than in corresponding Study Groups within the other two Centres. This striking difference cannot be vaguely explained away as a "cultural difference". We will discuss this question later in this Report, as it may provide a clue with regard to an important determinant of the use of CM.

Socio-economic factors: Some data regarding the socio-economic pofile of families using CM for their infants have been set out in Table 8.1. We will discuss briefly only a few major findings here.

In the present Study, we investigated the extent of use of CM in different income-groups. Considering the present cost of living, we will be justified in considering families with a total monthly income of less than Rs 300/- as *very poor;* those with monthly income between Rs. 300 and Rs. 500 as *poor;* those monthly income between Rs. 500 and Rs. 1000 as belonging to the *lower middle class;* and those with monthly incomes above Rs. 1000 as being of the *middle class* or affluent.

It was to be expected that a high proportion of relatively affluent families will be users of CM. This expectation was largely borne out; 90% of such families at the Calcutta Centre and 75% at the Madras Centre were using CM for their infants, but only about 30% of such families at the Bombay Centre – an observation in keeping with the generally low usage of CM at Bombay reported above. However, what was important was the finding that high proportions of 'poor' and 'very poor' families were also using CM. Thus at Calcutta nearly 24% of very poor families, 48% of poor families and 66% of lower-middle income families were feeding CM for their infants. At the Madras Centre, the position was even worse; 37% of 'very poor' families, 61% of 'poor' families and nearly 66% of the 'lower-middle-income' families were using CM. At the Bombay Centre, in keeping with the relatively low usage of CM at all levels, 9% of 'very poor' families, 21% of 'poor' families and 24% of lower-middle income families were using CM.

The proportion of CM users was no doubt larger among the affluent groups than among the low income groups, but the affluent group constituted only a small minority of the general population. As a result, the great majority of families actually using CM in the population as a whole belonged to the poor income-groups. Thus at the Calcutta Centre, the 'very poor' and 'poor' families accounted for over 60% of CM users in the population studied; at the Madras Centre for nearly 67%, and at Bombay Centre for 36%. The amounts in which commercial infants foods are used for *individual* infants of different socio-economic groups may of course be expected to differ widely – the poor infant consuming far less than the affluent one. So, the differences in the percentages of 'CM' or 'CC' users will not reflect the overall offtake of these foods by different income groups.

Nearly 18% of all families using CM at the Calcutta Centre, nearly 37% at the Madras Centre and nearly 23% at the Bombay Centre were actually living in thatched huts under unhygienic insanitary conditions. Nineteen percent of infants of totally illiterate mothers were receiving CM at the Bombay Centre; the corresponding figures for the Calcutta and Madras Centres were 26% and 34% respectively. Thus a very large proportion of infants currently being fed CM belong to 'poor' families which could neither afford to purchase the CM in adequate quantity nor command the facilities for their hygienic use. A high proportion of the mothers using CM for their infants could not read the instructions on the label.

The use of CM cannot, therefore, be dismissed lightly as an urban-elitist phenomenon. The fact that in the overall sense of numbers the major users of CM are the 'poor' living in unhygienic insanitary environment, signifies the major public-health implications underlying its use.

Some attributes of CM users: CM was used more often in extended and joint families than in nuclear families; but since in all Centres the numbers of nuclear families in the populations studied far exceeded the number of joint and extended families, nearly half of all CM users belonged to nuclear families. Since we may expect a pro-

gressive decline in the proportions of joint and extended families in the years ahead, it may be of practical importance to further elucidate the factors underlying the differences in the level of use of CM as between nuclear families on the one hand and joint and extended families on the other.

The child's birth order seemed to be a significant determinant. CM was most used for the first-born, and there was a progressive decline in its use with increasing birth order. There was *no difference* in the use of CM as between male and female infants in any Centre. The fact that a food considered 'prestigeous' was being given as often to girls as to boys is contrary to the prevailing impression of discrimination against female children.

CM was given to a much smaller percentage of children born at home than those delivered in hospitals (Government or private). Thus over 81% of infants delivered in private hospitals, and 54% of infants delivered in Government hospitals were receiving CM as against only 23% born at home at the Calcutta Centre. At Madras more than 60% of infants born in hospitals were receiving CM as against 40% of those born at home. At Bombay as against 26% and 22% of infants born in private and Government hospitals respectively receiving CM, only 15% infants delivered at home were fed CM. These figures are highly suggestive of the role of the "hospital system" in the promotion of CM use.

At Calcutta and Bombay, it was found that a small number of infants delivered in hospitals had been given pre-lacteal feed of CM by bottle even before they were put to breast. A relatively high proportion of such infants continued on CM. Fortunately, the practice of introducing the infant to bottle feeds of CM even before breast feeding started, was not observed at Madras.

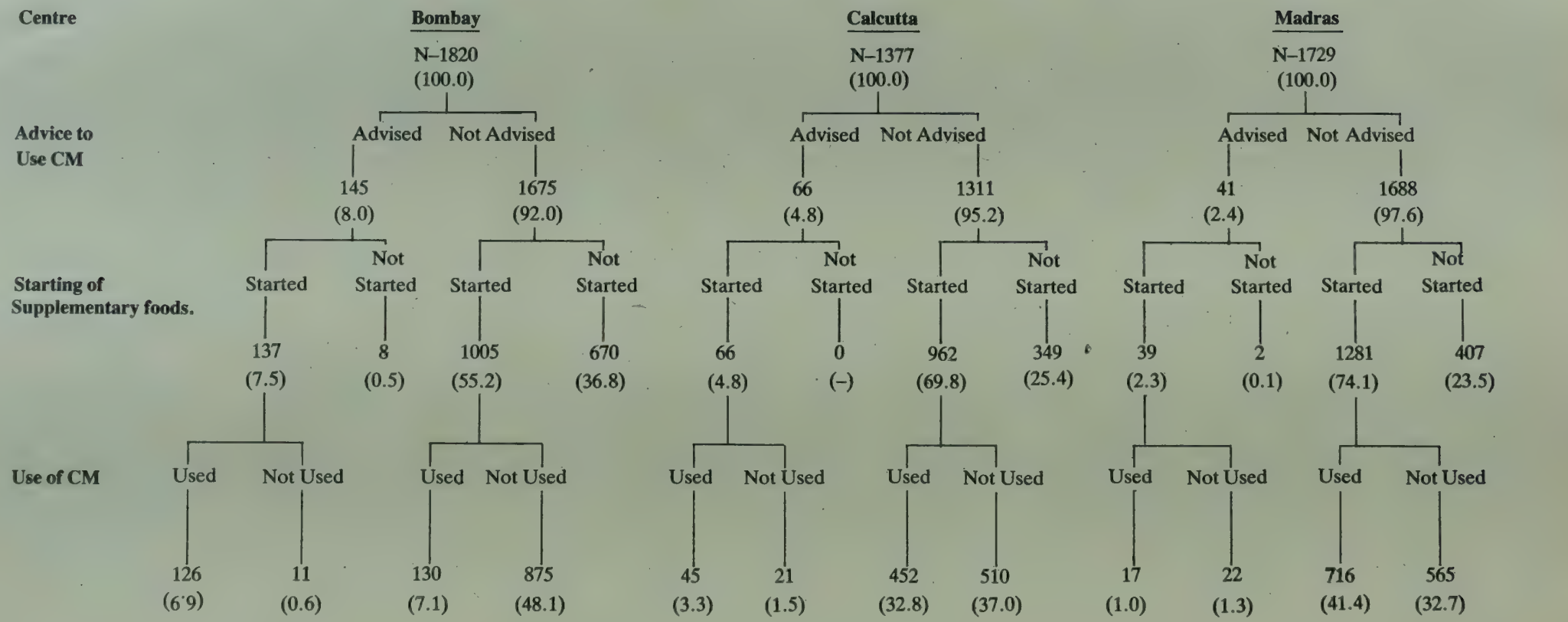
At all three Centres, it was observed that the death of an earlier baby had apparently acted as a disincentive to CM feeding. The proportion of CM use among mothers who had lost a baby earlier, was less than among infants whose mothers had no such unfortunate experience. The significance of this finding, if any, has to be further elucidated.

The role of health personnel: It is generally believed that the use of CM is largely determined and promoted by health personnel. But then, as we have seen from the data presented above, the great majority of CM users are the poor and low income-groups who do not have ready and direct access to health personnel. The affluent section of the population have of course far better and more direct access to health personnel than the poorer sections and we have already seen that the use of CM among them is very high. Of significance is the fact that a very high proportion of infants born in hospitals, as compared to those born at home, receive CM. The "hospital culture" obviously heavily favours the use of CM.

In the course of this Study, we tried to obtain information from CM users as to who advised them to use CM in the first place. We have presented the results of these enquiries in Chart 8.1. At Bombay, use of CM was definitely advised by health personnel in 145 infants, at Calcutta in 66 infants and in Madras in 41 infants. In the case of more than 90% of infants in the three Centres, however, the mothers received no such direct advice. When health personnel had advised CM, the advice was largely accepted. Thus out of a total of 252 mothers advised CM by health personnel in the three Centres, 188 (nearly 70%) followed the advice. Out of 4674 mothers in all three Centres who received no such advice, 1298 (28%) were using CM. It must, however, be added in fairness to some health personnel that they did advise continuance of breast-feeding as long as possible at least in a small proportion of cases.

The important points that emerge from the above analysis are that: (1) health personnel do advise the use of CM to those whom they come into contact with and such advice is largely accepted; (2) Among low income-groups who do not have ready access to health personnel and who had not been advised the use of CM, a significant proportion was still using CM , though the proportion was not as high as among the "advised group". It is not clear from this Study as to why and how they made this choice. There may be several reasons, but we

Chart 8.1—Advice and use of CM at the three Centres



N - Sample Size CM – Commercial milk

Figures in brackets indicate percentages.

may consider a possible one.

The affluent CM users, belonging to the high socio-economic, "better educated", elitist class, are the trend-setters whom the poor would envy and, if at all possible, wish to emulate. The wide use of CM by these trend-setters could have contributed to the "prestige" which CM enjoys in the eyes of the poor. The influence of health personnel on these trend-setters is strong. By (unwittingly?) promoting CM among this group, health personnel may also be playing an important, though indirect, role in the current widespread use of CM among the poor. Movements, as those now in operation in Europe and U.S.A., urging return to the traditional practice of breast-feeding *among the affluent*, may be an important part of the strategy for promotion of breast-feeding among the poor as well. Health personnel can play an important part here.

Reconstitution of CM: The major causes for concern over the use of CM by low income-groups are that: (a) the reconstitution of CM may be done under unhygienic conditions leading to infection, and (b) attempts will be made by low income-groups to 'stretch' the small quantity of CM, which is all that they can afford, by over-dilution leading to undernutrition. In the course of this Study we gathered information on how CM was reconstituted.

CM was used for 186, 464 and 561 infants at Bombay, Calcutta and Madras Centres at the time of our interview. Mothers of 21 infants at Bombay and of four infants at Calcutta admitted the use of unboiled water for reconstitution. We could obtain no response from mothers of 17 infants in Bombay and 40 in Calcutta on this point. All other mothers in Calcutta and Bombay, and all mothers in Madras claimed that boiled water was used for reconstitution. At Calcutta 46% of mothers were mixing CM powder with animal milk in preparing the feed; the practice was not significantly prevalent in Madras and Bombay. The practice of mixing CM and CC while reconstituting was followed in about 8% to 10% of CM users in the three Centres.

On the basis of label instructions on the containers of different types of CM, we prepared a schedule on proportion of milk powder and water needed for proper reconstitution. This helped us to identify infants in whose cases the dilution was "appropriate" (that is, as recommended in the label) and those in which it was not. We found that the recommended proportion of powder and water for reconstitution *was not followed for any infant* in Bombay, but followed for only 12 infants (3%) in Calcutta, and 6 (1%) in Madras. In most other cases there was considerable over-dilution. In 86% of infants in Bombay, 84% in Calcutta and 94% in Madras, the feed contained smaller amounts of CM than was recommended in the label. The interesting aspect was that even the "educated", "elitist", affluent section largely failed to follow the recommended instructions for reconstitution.

Mode of feeding: The affluent sections generally use feeding bottles for feeding CM. The use of feeding bottles calls for a high standard of hygiene, which the poorest communities cannot command. In Table 8.2, we have presented data that would show how CM was being fed by the poor income-groups in Bombay, Calcutta and Madras — from bottle or by spoon or from traditional vessels. It will be seen that as between CM and AM (animal milk) in all three Centres, CM was more often fed from bottle than AM. In Bombay and Madras, CM was fed from bottle much more often than by spoon or from traditional vessels. In Calcutta, however, spoon and traditional vessels were much more often used for feeding CM than bottles.

Many infants getting commercial infant foods were being bottle-fed. The use of bottle was fairly widespread in all three Centres but was particularly noticeable in Madras. While in Calcutta and Bombay conventional feeding bottles were used, in Madras more than half the 'bottle-users' used bottles of other kinds – such as medicine bottles. This was especially the case in poor homes.

Table 8.2 — Mode of feeding CM and AM

Household income	Percentage fed from bottle			Percentage fed by spoon or from traditional vessel		
	Bombay	Calcutta	Madras	Bombay	Calcutta	Madras
Rs. 300/- per mensem or less						
CM	67	37	77	33	63	23
AM	46	22	63	54	78	37
Rs. 301–1,000 per mensem						
CM	76	45	82	24	55	18
AM	50	28	56	50	72	44

CM – Commercial Milk AM – Animal Milk

People, so poor that they could not afford to buy feeding bottles, were resorting to bottle-feeding "because it was convenient". Most poor mothers used just only one bottle.

Since the greatest risk of bottle-feeding lies in infection arising from improper cleaning, we collected data in this Study on how the bottles were being actually cleaned. In Table 8.3 we have set out this information.

Table 8.3 — Pattern of cleaning bottles

Cleaning pattern	Percentage distribution of bottle-fed infants		
	Bombay	**Calcutta**	**Madras**
Sterilised	13.5	5.0	1.8
Cleaned with water (hot or cold and with brush/with or without soap)	77.7	75.3	92.3
Not cleaned after every feed	5.8	16.6	5.0
N.R	3.0	3.1	0.9
	100.0	100.0	100.0
Sample Size (N)	531	319	766

Sterilisation (and that too not after every feed) was practised to a significant extent only in Bombay. In Calcutta in a fair proportion of cases the bottle was not cleaned after every feed. In Madras in a high proportion of cases the bottles were cleaned in cold water like any ordinary cooking vessel, using mud or "chikai" (soap-nut powder).

Even in those instances where mothers claimed that they were sterilising the bottles, careful enquiry revealed that sterilisation was not done after every feed (Table 8.4).

The nipples on the bottles were usually left exposed between feeds and also often just washed in cold water.

It should thus be clear that the conditions under which bottle-feeding is practised and CM is being used, favour infections, especially in communities where environmental sanitation is poor and safe water supply is often not available. These

Table 8.4 — Pattern of sterilisation of bottles

Sterilisation pattern	Percentage distribution of infants		
	Bombay	Calcutta	Madras
Sterlised after every feed	11.5	2.2	0.9
Sterilised for half or more than half the number of feeds	10.9	4.7	1.0
Sterilised for less than half the number of feeds	23.7	29.5	1.7
Not sterilised	50.9	61.1	95.4
N.R.	3.0	2.5	1.0
	100.0	100.0	100.0
Sample Size (N)	532	319	76

observations underscore the risks involved in promoting the use of CM/CC among the poor income-groups who can hardly afford them and who cannot command necessary hygienic standards essential in their use.

Use of CM within the first month after birth: CM had been started within the first month after birth in 3% of all infants at the Bombay Centre, 7% of all infants at the Calcutta Centre and 2% of all infants at the Madras Centre. At Madras, of the 36 infants who had been started on CM within the first month, 26 were not breast-fed at all; in other words, CM had totally replaced breast milk in these children. This was the case with regard to 17 of 51 infants receiving CM within the first month at the Bombay Centre, and 14 of 101 infants at the Calcutta Centre.

Since there were as many as 101 infants in the Calcutta Centre sample who had been started on CM within the first month itself, it may be interesting to consider what proportions of infants belonging to different socio-economic groups were fed CM within the first month itself. It was seen that nearly 30% of the relatively affluent groups had started their infants on CM even within the first month after their birth. More than one third of infants born in hospitals (27.2% in private hospitals and 7.2% in Government hospitals) had started receiving CM within the first month itself. It is probable that the great majority of these infants came from the relatively affluent group who could afford not only delivery in hospitals (especially private hospitals) but also CM for their infants. Even so, that such a high proportion of infants born in hospitals "took to the bottle" so early in their lives, would suggest the prevalence of a highly favourable "climate" for the promotion of CM in hospitals, especially the private ones. In an earlier Chapter, we had referred to our finding that a high proportion of infants who had been fed CM even before they could be put to breast (pre-lacteal feeding) was made up of infants born in hospitals (especially private ones).

The more disturbing finding was that 33.4% (nearly one third) of 'lower middle class' and 'poor' families at the Calcutta Centre had started their infants also on CM even within the first month of their birth.

Age at introduction of CM: Table 8.5 gives the distribution of infants receiving CM according to their age when the food was started. *Of all infants receiving CM,* it was found that CM had been started before the end of six months in about 92% of infants in Bombay, 95% of infants in Calcutta and 93% of infants in Madras. Some paediatricians advise introduction of supplements by the fourth month; it was found in the Study that about 51% of infants in Bombay, 63% in Calcutta and 37% in Madras had been started on CM even before the third month. Nearly 20% of infants in Bombay and Calcutta and about 5% in Madras started receiving CM even within the first month. The "early CM starters" were infants who belonged mostly to families with high socio-economic status, high level of education, high per capita income and born at private hospitals (Table 8.1).

Table 8.5 — CM-fed infants by their age at starting

Centre	Percentage distribution of CM-fed infants by their age at starting CM (in months)						
	Less than 1	1–2	3–4	5–6	7+	Total	Sample size (N)
Bombay	19.8	31.4	31.4	9.3	8.1	100.0	258
Calcutta	20.5	42.1	23.1	9.5	4.8	100.0	497
Madras	4.9	31.8	43.2	13.4	6.7	100.0	733

CM – Commerical milk

The important message is that in more than 90% of cases where CM is used, it is used in early infancy (before six months) — in a substantial majority of cases within three months. Thus CM could be an important factor in discouraging exclusive breast-feeding even for the first four months of infancy. To that extent its use generally implies erosion or undermining of breast-feeding and also exposure of the infant to the risks of infection in *early* infancy. It may be argued that animal milk is also used as a supplement in a majority of cases within the first six months. But as we have pointed out elsewhere, animal milk is: (1) much less expensive and (2) being invariably boiled before use, it is much less likely to promote infections.

Duration of use of CM: In assessing the duration, we took into account the month when CM was started and either the month CM was discontinued or the age of the child at our interview, if CM was still being given. The inclusion of the latter group might have contributed to some under-estimation of the duration of CM feeding. We had mentioned earlier that CM had been started at some time or other for 258, 497 and 733 infants in Bombay, Calcutta and Madras respectively. We found at the time of our interview that of these as many as 186 or 72% in Bombay, 464 or 93% in Calcutta and 561 or 76% of infants in Madras were still getting CM. In order to get a better estimate of the duration of CM feeding, we selected the group of older infants (10-12 months) who numbered 83, 120 and 249 at the three Centres. Their distribution by duration of use of CM is given in Table 8.6.

Several children who were receiving CM as supplement or substitute, were also receiving other foods. Later in the Report, we present data

Table 8.6 — Duration of use of CM among older infants

	Percentage distribution of CM-fed older infants by duration					
	3 months or less	4–7 months	8 months or more	Total	Sample size (N)	Mean
Bombay	31.3	32.6	36.1	100.0	83	5.5
Calcutta	12.5	36.6	50.1	100.0	120	6.8
Madras	25.3	37.0	37.7	100.0	249	5.8

CM Commercial milk

regarding the use of CM and CC in infants as supplementary food, in the total context of infant feeding.

Commercial Cereal Foods

Extent of use: Commercial cereal foods (CC) were used as supplements to breast milk, animal milk or CM. We, therefore, ascertained the proportion of infants given CC among those who were on supplemental or substitute foods. Of infants receiving supplements, CC was used for 25% of infants in Bombay, 14% in Calcutta and 31% in Madras. The corresponding percentages for use of CM at the three Centres were 23%, 48% and 56% respectively.

The attributes of families using CC were nearly similar to those using CM (Table 8.7). A very high proportion of infants of families with high income and high socio-economic status, who were delivered in hospitals (especially private hospitals), received CC. Higher proportion of first-born infants got the food than infants of higher birth orders. Generally, CC was in much less use than CM at the Calcutta and Madras Centres. In Bombay city, however, CC was used nearly as much as CM. The use of CC in the rural areas of all Centres was much less than the use of CM.

CC had been advised by doctors for 168 (9% of all) infants in Bombay, 438 (32% of all) infants in Calcutta and 377 (22% of all) infants in Madras. The estimated percentage of infants actually receiving CC at these three Centres, however, were 15%, 10% and 24% respectively at Bombay Calcutta and Madras. Thus in Bombay practically all infants who were advised CC by the doctors received the food; quite a few not so advised also received CC at the Bombay Centre. In Calcutta, no infant who was not advised CC by doctors ever received CC; on the other hand in quite a large proportion of such infants who received such advice, the advice was *not* followed. In Madras also, the doctor's advice to use CC was ignored in a large proportion of cases; but unlike in Calcutta, CC was being used in a good proportion of infants with no advice from doctors.

A comparison of Charts 8.1 and 8.2 which present data regarding advice and use of CM and CC respectively reveals an interesting finding. Health personnel seemed to have largely preferred to advise CC rather than CM; this trend was highly evident in the data in Calcutta and Madras and to a much smaller extent in Bombay. Equally interesting were the findings that (a) the advice to use CC was ignored to a considerable extent in Calcutta and Madras. Thus in Calcutta while nearly 32% of infants were advised CC, only 10% followed the advice. In Madras, while CC was advised for nearly 22% of infants, the advice was followed by only 10%. (b) No infant which was not advised CC received the food in Calcutta, while in Madras, 14% of infants fed CC were those who had not been so advised. (c) Unlike with CC, nearly 33% of infants in Calcutta and 41% of infants in Madras receiving CM were those who had not been so advised. It appeared that while the 'preference' of health personnel at least as far as Calcutta and Madras Centres were concerned was for CC, the 'preference' of the public lay with CM. This phenomenon needs further examination.

Age at Starting CC: The manufacturers of CC recommend that their CC food be started at the age of three months and the health personnel apparently fall in line. It is, therefore, not surprising for a majority of CC-fed infants, namely 60% in Bombay, 55% in Calcutta and 49% in Madras that CC had been started at three months of age. A few mothers had started the food even earlier. 13% of CC-fed infants in Bombay, 12% in Calcutta and 13% in Madras had been started on CC after six months. We found that out of 280, 142 and 410 infants in Bombay, Calcutta and Madras respectively to whom CC was started at some time earlier, 226 (81%), 128 (90%) and 295 (72%) were still using it at the time of interview.

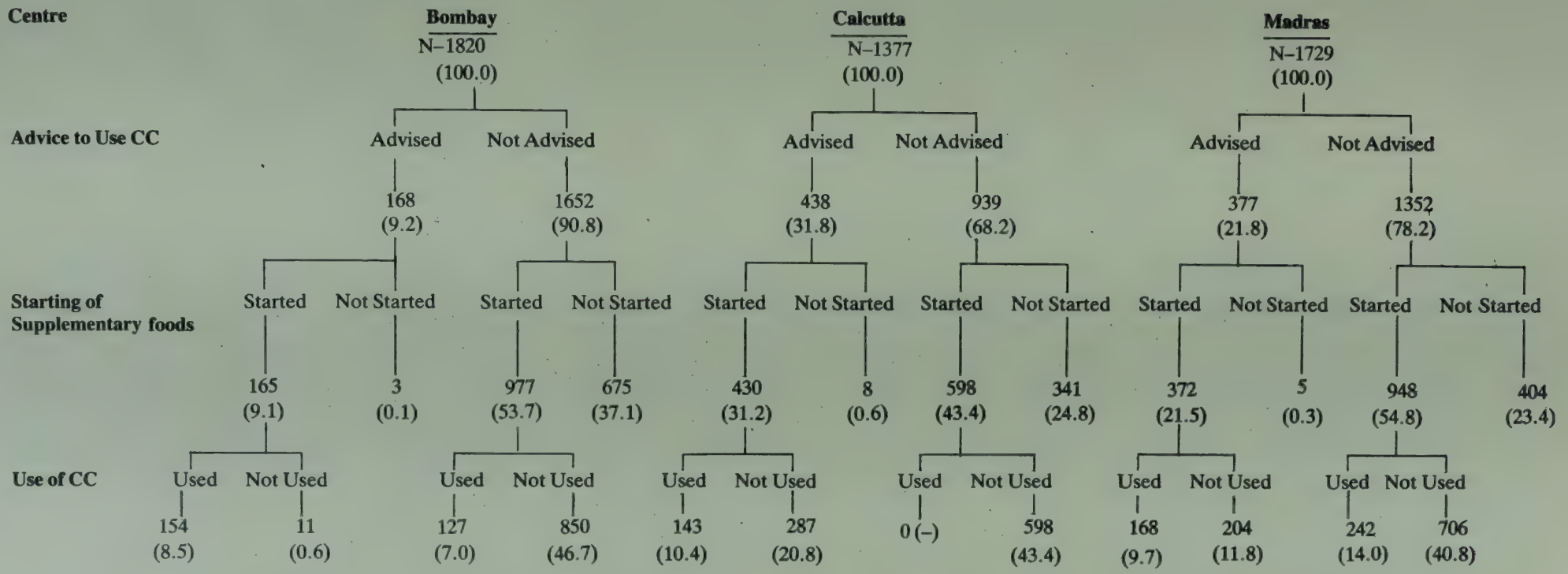
Reconstitution of CC: Complete details regarding the reconstitution of CC were collected for 207 infants in Bombay, 103 in Calcutta and 285 in Madras. These data are presented in Table 8.8. We describe below some of the reconstitution procedures followed in the different Centres.

Table 8.7 — Socio-economic profile of Infants given CC in different Study Groups at three Centres

Category	Percentage of infants given C C		
	Bombay	Calcutta	Madras
Study Groups			
City	29.4	22.4	39.3
SU	35.1	8.1	37.1
R	8.8	5.1	11.7
T1	26.0	16.7	19.9
T2	3.7	6.1	29.7
Type of dwelling			
Hut	13.5	2.4	15.2
Chawl	20.8	5.1	34.9
Apartment or independent house.	39.0	20.2	46.1
Type of family			
Nuclear	21.1	9.1	28.7
Extended	27.5	16.7	32.9
Joint	27.4	19.3	34.5
Per capita income per month (Rs.)			
50 or less	4.1	2.6	14.6
51 – 100	12.3	9.3	28.7
101 – 150	24.9	18.0	44.3
151 – 200	37.8	39.2	62.1
201 +	51.0	51.4	63.9
Mother's education			
No education	7.5	1.9	9.8
Low	18.1	6.2	27.6
High	42.0	34.3	45.3
Mother's activity status			
Worker	27.2	39.4	–
Non-worker	25.1	12.9	–
Child's birth order			
First	35.9	24.2	40.1
Second or third	23.3	11.1	33.9
Fourth or above	11.9	4.0	16.4
Child's sex			
Boy	26.8	13.8	33.8
Girl	22.0	13.9	28.5
Place of delivery			
Home	20.2	0.9	19.8
Govt. Hospital	16.3	14.5	29.7
Pvt. Hospital	42.1	39.6	46.0

SU : Semi Urban, R : Rural, T1 : Town with population of 50,000 – 99,999. T2 : Town with population of 20,000 to 49,999. CC : Commercial cereals

Chart 8.2—Advice and use of CC at the three Centres



Figures in brackets are percentages.
N – Sample size CC – Commercial cereals

Table 8.8 — Reconstitution of CC Feed

Medium used	Percentage distribution of infants given C C feed					
	3–6 Months			7–12 Months		
	Bombay	Calcutta	Madras	Bombay	Calcutta	Madras
Water	20.8	35.3	65.4	46.1	29.0	68.5
Animal Milk	46.3	26.5	12.9	30.5	24.6	13.6
Animal Milk + Water	22.4	11.8	5.9	8.5	–	2.7
Commercial Milk	9.0	20.6	9.8	4.3	39.1	12.0
Animal Milk + Commercial Milk	–	–	4.0	0.7	4.3	1.0
Other Foods	1.5	5.8	2.0	9.9	3.0	2.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
Sample size (N)	66	34	101	141	69	184

For younger infants in Bombay, CC was generally mixed with some kind of animal milk. This practice was followed for 46% of young infants using CC in Bombay. For twenty-two per cent of young infants in Bombay using CC, the food was mixed with animal milk and water, and in 21% of infants with just water alone. The practice of mixing CC with CM was followed for only 9%. In Calcutta, CC was mixed with water in the case of 35% of infants, with animal milk for 26%, with water and animal milk for another 12%, and with CM for about 21% of infants.

In Madras, however, in the great majority of infants receiving CC (65%) reconstitution was done just with water. Animal milk and CM was used as 'diluents' in 13% and 10% of infants respectively.

For older infants, at all three Centres, reconstitution was done in a high proportion of cases with water alone except that at Calcutta Centre, even among older infants receiving CC, in nearly a third of cases was mixed with some CM as well.

The above data regarding the ingredients that go into the preparation of a feed containing CC, do not however reveal the full picture. The amount of CC that was actually given to the infant in any feed, in a great majority of cases at all three Centres, was no more than just one to two teaspoonfuls and the feed was diluted to thin watery consistency. The usual proportion was just one to two teaspoonfuls and the total quantity of the prepared feed including the water was less than five ounces in most cases. Thus most of these 'feeds', especially among the poor, were no more than half-feeds or just token feeds, given merely to "fill the infant's stomach" for the time being.

The picture of CM and CC use at the time of our interview: At the time of our study 37% of infants in Bombay, 25% of infants in Calcutta and 23% of infants in Madras were on breast milk. The rest were either receiving supplementary foods (besides breast milk) or were on substitute foods (with no breast milk). Among such infants we have indicated the distribution of CM/CC users in the different Study Groups, who were either on supplementary or substitute foods who numbered 1142 at Bombay, 1028 at Calcutta and 1320 at Madras Centres, as many as 31% in Bombay, 46% in Calcutta and 53% in Madras received commercial infant foods — either CM or CC or both. In Table 8.9 we have indicated the overall percentage distribution of infants by the use of CM, CC or both as

Table 8.9 — Use of commercial infant foods in different age-groups at three Centres

Age and sex of infants	Sample Size (N)			Percentage distribution of infants by use of commercial foods											
				CM			CC			Both CM & CC			None		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Very Young															
Boys	53	95	89	20.7	47.4	43.8	1.9	1.0	4.5	1.9	3.2	2.2	75.5	48.4	49.5
Girls	49	102	86	30.6	50.0	48.8	–	1.0	4.7	10.2	3.9	2.3	59.2	45.1	44.2
All	102	197	175	25.5	48.8	46.3	1.0	1.0	4.6	5.9	3.6	2.3	67.6	46.6	46.8
Young															
Boys	139	128	126	13.7	33.6	31.0	17.3	1.6	16.7	5.8	8.6	17.5	63.2	56.2	34.8
Girls	129	152	153	22.5	27.0	30.0	16.3	–	13.1	7.0	16.4	15.7	61.2	56.6	41.2
All	268	280	279	14.6	30.0	30.5	16.8	0.8	14.7	6.3	12.8	16.5	62.3	56.4	38.3
Older															
Boys	428	272	425	7.6	29.4	24.9	17.3	1.4	10.4	4.6	15.9	15.5	70.5	53.3	49.2
Girls	344	279	441	7.6	31.2	29.0	12.5	1.0	7.0	5.5	11.5	12.5	74.4	56.3	51.5
All	772	551	866	7.6	30.2	27.0	15.2	1.3	8.7	5.1	13.7	14.0	72.1	54.8	50.3
All age-groups															
Boys	620	495	640	10.2	34.0	28.8	16.0	1.4	10.8	4.7	11.5	14.0	69.1	53.1	46.4
Girls	522	533	680	11.7	33.6	31.8	12.3	0.8	8.1	6.3	11.4	11.9	69.7	54.2	48.2
All	1142	1028	1320	10.8	33.8	30.3	14.3	1.1	9.4	5.4	11.4	13.0	69.5	53.7	47.3

CM – Commercial milk CC – Commercial cereals NR – Not recorded 1 Bombay 2 Calcutta 3 Madras

observed at the time of our study.

The proportions of CC users who were CM users as well varied at the three Centres. While only eight per cent of the CC users in Calcutta had also used CM, the proportion was 39% in Bombay and 70% in Madras. Since the majority of CC users were also CM users in Madras, their characteristics were nearly similar. In Calcutta, this was not so as only 8% of CC users had used CM. It would appear that the poor and low income-groups in Madras while preferring CM were also using CC to a significant extent. Thus 14% of infants who had no access to 'health advice' were using CC in Madras. On the other hand, the poor and low income-groups in Calcutta apparently used CM and avoided CC. Thus no infant not having access to health advice at Calcutta was receiving CC.

As was to be expected, commercial infant foods (CM and CC) were used in a higher proportion of high-income house-holds (income exceeding Rs. 1001/- per month) – 63% in Bombay, 76% in Calcutta and 63% in Madras. The corresponding percentages for low-income house-holds (income less than Rs. 300/- per mensem) were 29% for Bombay 40% for Calcutta and 33% for Madras. But, again, as had been pointed out earlier, since the low income-groups vastly outnumber the affluent, when absolute numbers are considered, the majority of commercial infant foods users in the country today are the 'very poor', 'poor' and 'low income-groups'.

Reasons proffered for use of commercial infant foods: Among the major reasons advanced by mothers for using these foods for their infants (Table 8.10) were : (1) They were advised to do so; (2) they believed that these foods were 'nutritious', 'good for digestion and growth'. This latter belief was expressed by 13% of mothers using these foods in Bombay, 16% in Calcutta and 21% in Madras respectively; (3) Some mothers had had 'good reports' of the use of these foods by their relatives or friends. (4) Nearly one fourth of the users of these foods said they used them because they found them convenient. (5) Many mothers said they had no specific reason but had simply decided to use these foods. Among 'reasons' reported by a small minority of mothers were the following: (1) that their infants like the foods; (2) the mother was working; (3) that the foods were less expensive (!).

The mothers were given the option to offer more than one reason for use of commercial infant foods, but by and large they gave just one reason. In the metropolitan cities, the most important reason was that the mother had been *so advised* — 59% in Bombay City, 61% in Calcutta City and 50% in Madras city. This reason (advice) did not figure prominently in the rural areas or the small towns. It was also interesting that a much higher proportion of "educated" mothers received such advice (61% in Bombay, 70% in Calcutta, and 54% in Madras). Among illiterate mothers, the advice was offered to a less proportion — 34% in Bombay, 26% in Calcutta and 42% in Madras. These figures give no room for satisfaction or complacency. Illiterate mothers (who are also invariably poor and who live in unhygienic surroundings) constitute the majority; therefore, in actual absolute numbers, the number of illiterate mothers and mothers with low education advised to use these foods will far exceed the numbers of 'better educated', affluent mothers receiving such advice.

In this Study, we obtained confirmation of the impression that higher proportions of working mothers use commercial infant foods for their infants than non-working mothers only as far as Madras Centre was concerned. Thus in Madras, against 86% of working mothers who were using these foods for their infants, only 57% of non-working mothers were using them. In Bombay, the proportions of working and non-working mothers using commercial infant foods were nearly similar.

It was strange that "convenience of preparation" was mentioned as the reason for use of commercial infant foods by a much higher proportion of illiterate mothers and mothers of the lowest income-groups than educated mothers of affluent families. This should make us doubt if the low income group mothers had really understood that water used for reconstitution of the food must be

Table 8.10 — Reasons for use of CM and CC in different Study Groups at three Centres

Category	Sample Size (N)			Percentages of infants for whom the different reasons were given																				
				Nutritious			Convenient			Advised			Good earlier experience			Mother's own decision			Other reasons			N.R.		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Study Group																								
City	212	227	418	8.5	11.5	17.9	28.3	25.1	0.7	59.0	61.2	50.5	4.8	1.3	23.7	1.4	2.2	15.8	3.9	2.1	1.5	2.4	–	0.5
SU	57	10	41	14.0	20.0	22.0	33.4	40.0	2.5	54.4	40.0	53.7	8.8	–	22.0	1.8	–	22.0	3.6	–	–	1.8	–	–
R	15	46	43	–	17.4	16.3	33.3	34.8	–	40.0	45.6	37.2	–	–	25.6	–	2.2	20.9	13.9	–	–	–	–	2.4
T1	52	92	85	34.6	21.7	32.9	21.6	13.0	–	44.2	58.7	49.0	3.8	3.3	9.4	–	3.3	9.5	–	4.4	3.6	3.8	–	1.2
T2	14	101	108	21.4	17.8	27.8	28.6	19.8	–	50.0	56.4	44.4	–	1.0	14.9	–	5.0	14.9	–	2.1	0.9	–	–	–
Household income p.m. (Rs.)																								
300 or less	14	76	204	7.1	17.1	30.4	42.9	36.8	1.5	28.6	39.5	33.3	7.1	1.3	12.7	7.1	4.0	21.1	–	2.6	0.5	7.1	–	0.1
301-500	61	119	167	11.5	20.2	18.0	32.8	28.6	–	54.1	46.1	41.9	3.3	1.7	31.1	–	0.8	15.6	4.9	5.0	2.4	1.6	–	0.6
501-1000	141	162	204	15.6	14.2	20.6	27.7	22.8	–	51.1	61.7	51.5	3.6	1.8	22.5	1.4	1.8	9.3	2.1	1.2	1.5	1.4	–	0.5
1001+	123	100	118	13.0	11.0	11.9	23.6	8.0	0.9	62.6	76.0	62.7	6.5	1.0	16.1	0.8	7.0	16.1	2.4	–	1.7	1.6	–	–
Mother's education																								
No education	61	98	76	11.5	24.5	27.6	52.5	43.9	–	34.4	26.5	42.1	1.6	1.0	19.7	–	2.0	17.1	8.1	3.0	1.3	–	–	1.3
Low	90	113	231	13.3	16.8	25.5	22.2	23.0	0.9	54.4	54.9	42.0	5.6	2.6	20.8	2.2	0.9	17.3	4.4	3.6	–	3.3	–	1.3
High	198	263	388	13.6	11.4	17.8	19.7	15.2	0.5	61.1	70.3	54.1	9.1	1.1	20.6	1.0	4.2	13.9	1.5	1.2	2.4	2.5	–	–
Mother's activity status																								
Worker	45	21	42	15.6	4.8	16.7	31.1	4.8	–	53.3	85.7	50.0	2.2	–	23.8	–	4.8	11.9	8.9	–	9.6	4.4	–	–
Non-worker	296	453	653	13.2	15.7	21.7	27.7	23.6	6.6	55.1	56.7	48.7	5.4	1.6	20.4	1.3	2.9	15.6	2.7	2.4	0.2	1.7	–	0.6
Use of CM and CC																								
CM Used	124	347	400	5.7	17.3	23.5	33.9	25.1	1.0	48.4	52.2	42.2	3.2	2.0	23.5	0.8	2.3	14.5	8.0	2.4	1.2	1.6	–	0.5
CC Used	163	11	124	13.5	27.3	14.5	25.8	27.3	–	54.6	45.4	54.8	4.3	–	11.3	1.2	3.4	21.8	–	–	0.8	3.1	–	1.6
Both Used	62	118	171	12.9	9.3	21.6	22.6	16.1	–	69.4	75.4	59.6	9.7	–	20.5	1.6	–	12.9	3.2	2.5	2.4	–	–	–

The percentages do not add up to 100.0 due to multiple responses.. 1. Bombay, 2. Calcutta, 3. Madras CM – Commercial milk, CC – Commercial Cereals NR – Not recorded.

Table 8.11 — -Percentage of infants according to use of commercial infant foods compared to exclusive breast-feeding

Study Groups and per capita per months (Rs.)		Percentage distribution of infants *								
		CM Given			CC Given			Exclusively breast-fed		
		1	2	3	1	2	3	1	2	3
City	50 or less	8.6	24.2	38.6	2.4	1.1	15.8	40.7	43.2	28.8
	51 –100	15.6	47.5	56.0	9.1	9.0	24.1	39.5	29.5	20.5
	101–150	21.0	60.3	57.7	20.4	20.6	36.6	26.3	14.7	18.7
	151–200	24.8	70.2	73.4	30.4	36.2	64.1	21.0	14.9	7.8
	201 +	31.9	97.7	67.7	55.5	53.5	59.4	10.1	2.3	12.5
SU	50 or less	12.5	–	26.5	–	–	8.8	50.0	23.1	29.4
	51 –100	10.8	23.8	46.2	8.1	–	30.8	43.2	33.3	26.9
	101–150	13.7	37.5	69.2	23.5	–	53.8	39.2	12.5	–
	151–200	24.4	33.3	66.7	33.3	33.3	44.4	26.7	33.3	11.1
	201 +	26.0	–	100.0	32.0	–	75.0	22.0	–	–
R	50 or less	8.7	8.1	20.5	–	–	4.0	30.4	27.6	29.8
	51 –100	12.5	17.9	43.2	5.0	1.8	18.2	37.5	30.4	22.7
	101–150	37.5	33.3	18.2	18.8	4.2	18.2	12.5	25.0	36 4
	151–200	14.3	50.0	50.0	–	14.3	–	28.6	28.6	50.0
	201 +	–	57.1	33.3	12.5	57.1	66.7	25.0	14.3	–
T1	50 or less	1.8	13.4	20.3	7.1	3.2	8.9	51.8	34.9	38.0
	51 –100	7.8	34.2	36.1	6.9	11.4	17.5	48.0	27.2	20.6
	101–150	8.3	44.4	53.6	16.7	14.8	14.3	31.9	22.2	14.3
	151–200	3.1	64.3	70.0	37.5	57.1	40.0	12.5	7.1	10.0
	201 +	15.0	81.8	66.7	40.0	63.6	50.0	12.5	–	33.3
T2	50 or less	1.3	21.5	16.4	–	2.2	9.0	67.9	22.2	31.3
	51 –100	4.6	32.0	38.0	1.5	4.0	24.0	53.4	18.0	18.0
	101–150	9.6	77.8	48.7	–	14.8	51.3	46.2	11.1	17.9
	151–200	8.3	62.5	73.7	–	12.5	52.6	41.7	25.0	10.5
	201 +	25.0	90.9	53.8	18.8	18.2	30.8	18.8	–	15.4

CM Commercial milk CC Commercial cereals T1 Town with population 50,00 to 99,999 T2 20,000 to 49,999
1. Bombay 2. Calcutta 3. Madras
** Some of the infants received both CM and CC. So the percentage of commercial infant foods users will be less than the sum of the percentages of CM and CC users.*

boiled or if they had understood it, if they were actually practising it. On the other hand, the "convenience" factor could be a valid practical reason. These foods do not need cooking and this implies considerable saving on fuel and time, and can therefore be readily offered over and above the 'family food' or breast milk.

Inverse relationship between exclusive breast feeding and CM/CC use : In Table 8.11, we have set out the percentage distribution of infants in different Study Groups (and income groups within Study Groups) who were receiving CM and/or CC or who were being exclusively breast-fed at the time of our Study. Exclusive breast-feeding generally obtains in the early part of infancy while infants receiving CM and/or CC belong either to early or late infancy. We are thus not dealing with the same age-periods while considering CM/CC users on the one hand and exclusively breast-fed infants on the other. For this reason, comparison of the percentages may be misleading. We have presented the data in the Table only to show the following: (a) that there is a striking inverse relationship between exclusive breast-feeding and use of CM/CC in a population group. Poor exclusive breast-feeding and high CM and CC use appear to be part of the same "infant feeding" culture: (b) that a higher percentage of infants of the urban poor get CM and/or CC than infants of the rural poor; thus, the urban poor are more vulnerable in this regard: (c) that there is a remarkable inter-regional variation with respect to exclusive breast-feeding and CM/CC use.

Expenditure on Commercial Infant Foods: An important consideration against the use of these foods is their high cost. If these foods are in fact used in the amounts recommended, a substantial part of the income of poor and low income families would go to the purchase of these foods. It is this dilemma which is now sought to be avoided by the frantic attempts to "stretch" the highly inadequate amount of these foods which is all that the poor can afford. If CM were to be solely used to meet the needs of the infant, the cost per month would be around Rs. 150/-. This figure has to be seen in the light of the fact revealed by this Study that nearly 30% to 40% of poor families with income levels less than Rs. 300/- per mensem (average of 4 to 5

Table 8.12 — Percentage distribution of infants according to percentage of household income per month spent on commercial foods.

CENTRE	Household Income Per-month (Rs.)	Sample Size (N)	Percentage of infants according to income spent on commercial foods		
			Less than 10%	10% or more	N.R.
Bombay	300 or less	15	46.6	26.7	26.7
	301 – 500	59	66.2	16.9	16.9
	501 – 1000	141	70.2	12.8	17.0
	1001 +	122	86.0	2.5	11.5
Calcutta	300 or less	80	30.0	65.0	5.0
	301 – 500	121	55.4	38.0	6.6
	501 – 1000	163	68.1	28.2	3.7
	1001 +	99	92.0	4.0	4.0
Madras	300 or less	215	27.0	65.1	7.9
	301 – 500	173	53.8	41.0	5.2
	501 – 1000	206	73.8	22.3	3.9
	1001 +	119	90.0	5.0	5.0

family members) had got into the practice of using these foods. But they could not afford to buy these foods in the amounts needed for adequate feeding, they were buying small quantitites and stretching them through overdilution.

Expense incurred by house-holds on Commercial Infant Foods: The numbers of infants receiving either 'supplementary' or 'substitute' foods were 1142 in Bombay, 1028 in Calcutta and 1320 in Madras. Of these, 348 in Bombay, 486 in Calcutta and 717 in Madras were receiving Commercial Infant Foods (CM, CC or both). The house-hold income per mensem was less than Rs. 1,000/- in the case of 61% of families using commercial infant foods in Bombay; in 79% of families using such foods in Calcutta and in 83% in Madras.

Even in the poorest homes with a total household income of less than Rs. 300/- per mensem, 65% of families in Calcutta and Madras and 27% of families in Bombay were spending more than 10% of their income on these foods, in spite of the fact that these foods were being used in small quantities as a minor supplement (Table 8.12).

It is, however, not just the expense incurred by poor families that can ill-afford such expense that should cause concern; it is the fact that even after such expense these foods in the amounts they are bought are inadequate to meet the infants' needs, and the manner in which these foods are given is so unhygienic that it should cause even greater concern.

Use of commercial infant foods in the total context of infant-feeding practices: The data presented so far on proportions of poor income-groups currently "using" commercial infant foods may give an exaggerated view of the actual contribution which these foods are now making to the overall diets of infants. In order that these data are seen in proper perspective, we must have the *total picture* of infant-feeding practices.

Our studies clearly indicate that breast milk still continues to be the most outstanding major food item in the infant's dietary, especially in poo income-groups among whom breast-feeding wa the near-universal practice. Even when all income groups including the affluent at all three Centre and Study Groups were considered, nearly 89% o infants were receiving breast milk either alone o with supplements. Indeed 30% of infants were exc lusively on breast milk without any supplements over 35% of infants were on breast milk with sup plements *other than* commercial infant foods an under 24% on breast milk with supplements o commercial infant foods. In interpreting thes data, it must be remembered that these data appl to *all* infants up to one year of age. If infants les than six months old were alone considered, th pre-eminence of breast milk would have emerge even more forcefully.

On the other hand, 31% of all infants were re ceiving commercial infant foods plus other supple ments with or without breast-milk. However, 76% of these infants receiving commercial infant food were *also* receiving breast milk. There were thu only 24% of infants in the Study who received com mercial infant foods alone without breast milk Thus 7.5% of all infants in the Study were receiv ing CM/CC without breast milk and nearly 24% were receiving it as supplement to breast milk. The actual amounts in which commercial infants food were used by the poor in the total daily feeds were small. We must again point out that these data in clude all infants up to one year of age and not in fants up to six months only.

Thus despite their wide usage the actual con tribution of commercial infant foods to the tota dietary of the infant was a minor one. Under these circumstances, we are justified in concluding tha despite their wide "usage" by the poor, these food have *not* (at least, as yet) *supplanted* the salutary practice of breast-feeding among the poor, even among those living in the rural environs of majo metropolitan cities. Breast-feeding has not as ye lost its supremacy in the dietary of the infants o the poor. What has, however, happened is tha these foods have found a place of prestige amon *supplements* to breast milk; they might have contri buted, perhaps partially, to the failure to exclusively breast-feed infants for even three to four months in a considerable proportion of poor mothers.

The current situation regarding use of commer

cial infant foods does not justify complacence, despite the fact that these foods still occupy a far lower place than breast milk in the total dietary of infants of the poor. There are clear danger signals. They have already established for themselves quite a substantial 'salient' or 'beach-head' in the dietary culture of the poor; and, given favourable conditions, they could certainly make further inroads. What may be inhibiting their intensive use at present is the fact that the poor can just *not afford* to buy these foods in the amounts they would like to. The really affluent constitute less than 10% of our population; and we found in our study that there were 7% of infants receiving commercial infant foods but no breast milk. This 7% is presumably drawn from the highly affluent group. This would suggest that increased income generation could be increasingly reflected in progressive displacement of breast milk, if present trends and fashions are not checked.

While, as pointed above, the overall contribution of commercial infant foods to the infant's dietary, and therefore, nutrition, may at present be small, their contribution to the morbidity of infants, and therefore to their malnutrition appears to be considerable.

The unhygienic condition in which these foods are presently stored, reconstituted and fed to infants in the poor homes, carry great risks of infections. Thus, on the one hand, the poor cannot afford these foods in amounts which will made a significant contribution to the infant's nutrition; on the other hand, they cannot also command the standard of hygiene needed in the use of these foods to avoid infections, which will actually undermine the infant's health and nutritional status. The net result is that under present circumstances, the 'benefits' of feeding commercial infant foods are not commensurate with the expenses incurred by poor families on these foods.

Brand names of commercial infant foods in use: In this Report we have deliberately avoided reference to brand names of different "baby foods" found to be in use in our study areas. In Table 8.13, however, we have listed these foods according to their brand names. The listing has been done strictly in alphabetical order and does not reflect the order of extent of use of these different foods.

Table 8.13 — Brand names of commercial infant foods found to be in use in the three Centres.

Commercial Milk — CM		Commercial Cereal—CC	
1. Amul spray	(Milk powder	1. Balamul	(Cereal food)
2. Angel	(Milk powder)	2. Cerelec	Cereal food)
3. Bounce	(Milk powder)	3. Farex	(Cereal food)
4. Bounce spray	(Dried whole milk powder)	4. Nestum-Rice	(Cereal food)
5. Glaxo Sunshine	(Milk powder)	5. Nestrum-Wheat	(Cereal food)
6. Lactodex	(Milk powder)		
7. Lactogen	(Milk powder)		
8. Raptakos	(Milk food)		
9. Sapan	(Milk powder)		

Chapter 9

Infant-feeding Practices in relation to Morbidity Profile and Growth Status

In the ultimate analysis, the merit of any infant-feeding practice has to be judged by its efficacy in promoting the health, and optimal growth and development of the infant. In the earlier Chapters, we considered different infant-feeding practices now in vogue in the three Centres. In this Chapter, we will consider how these practices were found to be actually related to the health, growth and development of the infants in the Study.

We report here the results of our Study on the profile of morbidity and the growth status of the infants in relation to their feeding practices.

Profile of morbidity : At the time of our interview, we had carefully obtained and recorded information regarding any illness which the infant had suffered during the fortnight preceding the date of interview. We had deliberately avoided asking for information regarding earlier ailments (before the preceding fortnight) as we felt that such recall would be unreliable. We term the fortnight preceding the date of interview as the "reference period".

About 60% of infants at Bombay, 56% at Calcutta and 63% at Madras were reported to have suffered some illness during the reference period.

The proportions of ill boys and girls at each Centre, indicated in Table 9.1, will show that there was no significant sex difference with regard to the profile of morbidity.

Table 9.1 — Percentages of ill boys and girls at three Centres during the reference period

	Bombay	Calcutta	Madras
Boys %	61.0	56.8	63.1
N (Boys)	958	667	846
Girls %	58.2	54.5	62.1
N (Girls)	862	710	883
Infants %	59.7	55.8	62.6
N (Infants)	1820	1377	1729

The proportion of ill infants increased wit age (Table 9.2).

Except for Madras, where we found a slightl greater evidence of morbidity in the low income groups, we found that, generally, differences i house-hold income levels were not associated wit striking differences in the *overall* prevalence o morbidity. However, it must be pointed out her that even the highest income-group in this Stud (house-hold income of Rs.1000/- and above) in cluded a majority of subjects who could by n means be considered affluent.

Our data with respect to the nature of illnes have the limitation that this information was en tirely based on the mother's response. On the basi of the expert advice of a paediatrician (Dr. D.C Desai, J.J. Group of Hospitals, Bombay), we clas sified illnesses on the basis of mother's respons under the following heads in order to facilitat analysis of our data (Table 9.3).

Table 9.2 — Percentage of ill-infants in different age-sex groups

Infant's age (in months)	Percentage of ill-infants								
	Boys			Girls			Infants		
	1	2	3	1	2	3	1	2	3
0	30.0	17.1	20.5	14.6	26.9	22.6	21.1	20.9	21.6
1–3	54.8	49.7	49.9	52.3	41.1	49.7	53.6	45.3	49.8
4	70.6	56.3	57.4	57.5	56.6	58.1	63.8	54.4	57.8
5–6	61.1	67.8	70.9	59.4	53.4	70.1	60.2	60.7	70.5
7–9	65.0	60.0	74.4	69.0	59.9	71.6	66.9	60.0	72.4
10–12	62.7	64.0	68.5	60.1	69.2	66.0	61.6	66.7	61.2
All Ages	61.0	56.8	63.1	58.2	54.5	62.1	59.7	55.6	62.6

1. Bombay 2. Calcutta 3. Madras

Table 9.3 — Classification of illnesses reported by mothers

Category		Illness
I	Gastro-intestinal diseases	diarrhoea, either alone or in combination with cough, cold, fever and vomiting, constipation, etc.
II	Respiratory problems	cough, cold with or without fever, T.B.
III	Other problems	measles, skin diseases, reactions to immunisation, conjunctivitis, etc.

The distribution of infants according to the types of their illnesses has been indicated in Table 9.4.

In Table 9.5 we have indicated the type of illnesses in relation to feeding pattern — either exclusively breast-fed on the one hand or on supplements or substitutes on the other — seen in infants of all ages. In Table 9.6, we indicate the type of illnesses in relation to feeding practice *and age* in all three Centres.

Exclusively breast-fed infants were apparently better off with respect to prevalence of morbidity. Comparatively fewer among them were ill, the proportions of those suffering from gastro-intestinal diseases and other ailments being the lowest in this group. Since exclusively breast-fed infants may be expected to include a larger proportion of younger infants, we had analysed the morbidity data for exclusively breast-fed and other infants of corresponding ages also (Table 9.6). The proportion of infants suffering from gastro-intestinal diseases does increase with age both among the exclusively breast-fed infants and among others, but exclusively breast-fed infants of less than six months clearly showed a distinctly lower prevalence of gastro-intestinal disorders than other infants of the same age-group.

In general, infants in whom supplementary foods had been introduced in early infancy suffered more often from illnesses including particularly gastro-intestinal disorders than those who were exclusively breast-fed during this age-period. However, prolonged exclusive breast-feeding beyond six months apparently did not confer any benefit with regard to freedom from illness.

More infants who received milk foods as supplements suffered gastro-intestinal disorders than those who received other types of supplements in Calcutta and Bombay, but not in Madras where infants receiving supplements other than milk foods appeared as much, if not even more, prone to alimentary disorders. Among supplements, the incidence of gastro-intestinal disorders was somewhat higher in CM or CC users than in infants using other supplements, but the difference was not as striking as expected. The type of vessel used for infant feeding—bottle or any other vessel—did not seem to make much difference. These observations would suggest that where the environment is highly unhygienic, except for infants exclusively on breast milk, all infants receiving any type of supplements are heavily prone to infections. In view of the resultant high prevalence of infections, differences *between* different types of supplements with respect to their association with infections were not as striking as the differences between the exclusively breast-fed infants (not receiving any supplements) on the one hand and those receiving supplements of any sort on the other.

We found evidence that illness brought about temporary changes in the feeding pattern. Thus in a small proportion of infants receiving animal milk or CM, before the illness, the milk was stopped or diluted. In a small proportion of infants, new foods like glucose, oral electrolyte solutions, arrowroot kanjee (arrowroot water) were introduced during illness, especially gastro-intestinal. Ginger, nutmeg, turmeric and *omum* (Basil) were used in a proportion of infants during respiratory infections.

The percentages of infants suffering from illnesses as reported here would be an underestimation of the quantum of morbidity. The illnesses

Table 9.4 — Type of illness among infants of different age groups

Centre and infant's age in months	Percentage distribution of infants by type of illness							
	GID	Respiratory Problems	Other Problems	GID and respiratory Problems	NR	No Illness	Total	N
Bombay								
0	4.2	12.7	4.2	–	–	78.9	100.0	71
1–3	7.4	42.6	3.6	–	–	46.4	100.0	364
4	7.8	48.9	5.7	1.4	–	36.2	100.0	141
5–6	11.8	36.4	11.4	0.6	–	39.8	100.0	324
7–9	16.0	37.5	11.0	2.2	0.2	33.1	100.0	456
10–12	15.3	34.7	9.7	1.9	–	38.4	100.0	464
All	12.2	37.5	8.6	1.3	0.1	40.3	100.0	1820
Calcutta								
0	–	10.4	10.4	–	–	79.2	100.0	67
1–3	8.4	27.5	9.1	0.6	–	54.4	100.0	320
4	12.9	21.8	19.8	1.6	–	44.6	100.0	101
5–6	10.1	31.5	18.4	0.4	0.4	39.2	100.0	267
7–9	13.7	26.9	18.5	0.8	–	40.1	100.0	367
10–12	20.2	25.7	19.6	1.2	–	33.3	100.0	255
All	12.3	26.5	16.2	0.7	0.1	44.2	100.0	1377
Madras								
0	1.0	19.6	1.0	–	–	78.4	100.0	97
1–3	2.7	41.4	5.7	–	–	50.2	100.0	331
4	8.6	40.5	8.6	–	–	42.3	100.0	116
5–6	14.0	44.3	12.2	–	–	29.5	100.0	271
7–9	18.6	43.3	10.7	–	–	27.4	100.0	457
10–12	19.3	31.5	16.2	0.7	–	32.3	100.0	457
All	13.4	38.5	10.8	0.2	–	37.1	100.0	1729

GID – Gastro-intestinal diseases

Table 9.5 — Gastro-intestinal diseases and over-all morbidity in infants in relation to different feeding patterns

Feeding pattern of infants	Sample size (N)			Percentage of infants					
				Gastro intestinal diseases			Other illnessess.*		
	1	2	3	1	2	3	1	2	3
Exclusively breast-fed	678	345	407	9.2	8.4	5.4	42.3	31.6	47.4
Breast milk +Supplem-entary foods	838	942	1025	13.4	13.6	14.4	51.9	47.5	51.6
Completely weaned	236	60	230	14.8	15.0	20.0	47.1	48.3	47.4
Never breast-fed	42	26	53	19.0	11.5	17.0	38.1	34.5	41.5

* *Other illnesses include respiratory and other problems mentioned in Table 9.3.* *1. Bombay; 2. Calcutta; 3. Madras*

Table 9.6 — Gastro-intestinal diseases and overall morbidity in infants of different age in relation to different feeding patterns.

Feeding pattern and infant's age in months	Sample size (N)			Percentage of infants					
				Gastro-intestinal diseases			Other illness*		
	1	2	3	1	2	3	1	2	3
Exclusively breast-fed									
0–3	332	187	252	6.3	5.3	0.8	38.3	25.2	39.7
4–6	197	87	107	8.1	9.2	10.3	47.7	36.8	57.9
7+	149	71	48	16.8	15.5	18.8	44.4	42.2	72.5
Breast milk+ Supplementary foods									
0–3	91	183	151	9.9	9.3	2.6	51.7	43.7	46.4
4–6	215	262	236	9.3	11.1	11.0	55.8	52.7	53.4
7+	609	497	638	15.1	16.5	18.5	50.8	46.3	52.2
Completely weaned									
0–3	3	7	12	–	–	25.0	66.6	57.1	16.6
4–6	33	13	32	21.2	–	21.9	45.5	53.8	53.1
7+	123	40	186	15.4	22.5	19.4	42.3	45.0	48.4

Other illnesses include respiratory and other problems mentioned in Table 9.3 *1. Bombay ; 2. Calcutta ; 3. Madras.*

reported here pertain *only* to the fortnight preceding the interview. An infant may be expected to suffer several such episodes during the infancy. The morbidity factor would thus be a major determinant of the nutritional and growth status of infants.

Growth and development: As was mentioned in an earlier Chapter, all infants in the Study were carefully weighed at the time of interview. The growth and physical development of the infants were assessed on the basis of the infant's weight in relation to his/her age. We used as the yardstick the international Harvard Standards (separate for boys and girls), not necessarily because we consider this standard as totally applicable to Indian infants, but because what we were mainly interested in here was the assessment of the *relative merits* of different infant-feeding practices. Moreover, these standards are in wide use and, therefore, in using these standards, we would be using a language, that would be widely understood nationally and internationally. We have studied the percentile distribution of the weights of infants of the different groups in this Study according to the Harvard scale; we have also studied their distribution according to the conventional Gomez's grades and also the IAP grade (suggested by the Indian Academy of Paediatrics) now widely used in the national programmes. We repeat that we are fully aware that these classifications are wholly arbitrary and the cut-off points therein do not have any physiological validity. However, for the limited purpose of comparison of different infant-feeding practices in vogue, the use of these procedures was considered appropriate.

To facilitate ready reference, the cut-off points in these 'classifications' are indicated in Table 9.7.

We have indicated in Table 9.8 the percentage distribution of infants (boys and girls) of different age-groups according to percentiles of the Harvard scale. In Table 9.9, we have set out the growth status data of all infants in the study according to the Gomez's classification. We must sound a note of caution in the interpretation of these data. All these data pertain to infants of the poorest groups of the population. The majority of infants of even the highest income-group in this study (house-hold income exceeding Rs. 1000/- per mensem) cannot, by any means, be considered affluent and as being free from socio-economic and environmental constraints on growth. For this reason, the data here should not be interpreted as providing any clue with regard to *growth standards* of *normal* Indian infants.

Table 9.7—Classifications of Growth Retardation

Gomez's Classifiction		**IAP Classification**	
Category	Classification	Category	Classification
Above 50th percentile	Excellent	Above 50th percentile	Excellent
Between 91%-100%	Normal	Between 81%-100%	Normal
Between 75%-90%	Retardation Grade - I	Between 71%-80%	Retardation Grade I
Between 61%-74%	Retardation Grade - II	Between 61%-70%	Retardation Grade II
Between 60% or less	Retardation Grade - III	Between 51%-60%	Retardation Grade III
		50 or less	Retardation Grade IV

The percentages relate to the value on the 50th percentile of Harvard Standard.

Table 9.8 — Percentage distribution of Boys and Girls in different age-groups according to Harvard scale percentiles

Centre and Infant's age (in months)	Percentage distribution of infants by sex and growth status																			
	98th and above	91st-97th	76th-90th	51st-75th	26th-50th	11th-25th	4th-10th	3rd or below	NR	Total	N	98th and above	91st-97th	76th-90th	51st-75th	26th-50th	11th-25th	4th 10th	3rd or below	NR Total	N
Bombay						**Boys**										**Girls**				
0–3	0.9	3.2	6.4	5.9	16.4	19.1	10.4	34.6	3.1	100.0	220	–	3.7	3.3	10.7	15.4	14.9	27.4	24.6	– 100.0	215
4–6	0.4	3.0	5.6	15.5	12.9	24.1	7.3	29.9	1.3	100.0	232	–	–	2.6	9.0	9.9	19.7	25.8	30.9	2.1 100.0	233
7+	–	0.2	0.6	4.4	10.7	12.4	16.6	53.3	1.8	100.0	506	–	0.7	0.5	2.7	7.0	17.6	20.8	49.3	1.4 100.0	414
All	0.3	1.6	3.1	7.4	12.5	15.8	12.9	43.3	2.0	100.0	958	–	1.3	1.7	6.4	9.9	17.5	23.8	38.2	1.2 100.0	862
Calcutta																				
0–3	–	0.5	2.5	2.5	5.5	11.6	9.6	62.1	5.5	100.0	198	1.6	0.5	1.6	3.2	9.0	11.1	17.5	52.9	2.6 100.0	189
4–6	0.6	1.2	2.4	4.1	13.0	4.7	16.0	53.8	4.1	100.0	169	1.0	1.0	1.0	3.0	5.0	16.6	22.1	44.3	6.0 100.0	199
7+	–	–	0.3	4.0	6.7	7.7	12.7	64.3	4.3	100.0	300	–	–	1.9	2.5	10.2	10.9	20.5	48.1	5.9 100.0	322
All	0.2	0.4	1.5	3.6	8.0	8.1	12.6	61.0	4.6	100.0	667	0.7	0.4	1.6	2.8	8.4	12.5	20.1	48.4	5.1 100.0	710
Madras																				
0–3	–	2.3	4.1	10.1	8.7	16.5	15.1	40.9	2.3	100.0	218	–	1.0	2.4	6.7	16.2	21.9	19.5	31.8	0.5 100.0	210
4–6	–	1.7	5.1	11.8	11.8	15.2	16.7	36.0	1.7	100.0	178	–	–	1.4	5.7	6.2	15.3	26.8	42.7	1.9 100.0	209
7+	–	–	0.4	4.0	8.2	12.7	18.7	53.6	2.4	100.0	450	–	–	1.1	2.4	5.8	11.4	23.5	53.0	2.8 100.0	464
All	–	1.0	2.4	7.2	9.1	14.2	17.4	46.6	2.2	100.0	846	–	0.2	1.5	4.2	8.4	14.8	23.3	45.6	2.0 100.0	883

Table 9.9 — Growth status (Gomez standards) of Boys and Girls in different age-groups

Centre and Infant's age (in months)	Percentage distribution of infants by sex and growth status															
	Boys								Girls							
	Retardation Grade								Retardation Grade							
	Excellent	Normal	I	II	III	NR	Total	N	Excellent	Normal	I	II	III	NR	Total	N
Bombay																
Less than one month	10.0	20.0	43.4	13.3	3.3	10.0	100.0	30	9.8	14.6	65.8	4.9	4.9	–	100.0	41
1–3	18.8	35.7	23.0	18.3	2.1	2.1	100.0	191	19.6	19.0	40.5	16.8	4.1	–	100.0	173
4	32.8	25.4	32.8	6.0	1.5	1.5	100.0	67	12.2	29.6	33.8	17.6	4.1	2.7	100.0	74
5–6	19.8	21.6	48.2	8.0	1.2	1.2	100.0	162	8.0	25.9	39.5	19.9	4.9	1.8	100.0	162
7–9	8.3	20.8	47.5	19.6	1.7	2.1	100.0	240	3.7	11.1	50.0	28.7	5.1	1.4	100.0	216
10–12	2.6	12.7	50.7	26.9	5.6	1.5	100.0	268	1.5	11.7	39.8	41.2	4.1	1.5	100.0	196
All	12.5	21.9	42.5	18.3	2.8	2.0	100.0	958	8.2	17.4	43.2	25.4	4.5	1.3	100.00	862
Calcutta																
Less than one month	2.4	21.9	36.6	17.2	14.6	7.3	100.0	41	7.7	15.4	26.9	30.8	15.4	3.8	100.0	26
1–3	7.6	15.3	33.8	24.2	14.0	5.1	100.0	157	8.6	10.4	35.0	27.6	16.0	2.4	100.0	163
4	12.5	12.5	33.3	27.1	10.4	4.2	100.0	48	7.6	26.4	49.1	7.6	3.8	5.5	100.0	53
5–6	5.0	17.4	48.8	18.2	6.6	4.0	100.0	121	4.8	15.1	33.6	33.6	7.5	5.4	100.0	146
7–9	4.6	10.9	47.4	26.3	4.0	6.8	100.0	175	3.1	14.1	39.6	25.5	9.9	7.8	100.0	192
10–12	2.4	12.8	46.4	32.8	5.6	–	100.0	125	4.6	16.2	36.2	30.8	10.0	2.2	100.0	130
All	5.4	14.2	42.7	25.0	8.2	4.5	100.0	667	5.5	14.8	36.9	27.5	10.6	4.7	100.0	710
Madras																
Less than one month	13.6	20.4	34.1	22.7	4.6	4.6	100.0	44	13.2	24.5	39.6	13.2	7.6	1.9	100.0	53
1–3	17.8	29.3	27.6	19.5	4.0	1.8	100.0	174	9.6	22.3	40.8	21.7	5.6	–	100.0	157
4	22.2	18.5	42.6	1.1	1.8	3.8	100.0	54	11.3	17.7	46.8	16.1	6.4	1.7	100.0	62
5–6	16.9	24.2	43.6	11.3	3.2	0.8	100.0	124	4.8	15.6	45.6	28.6	3.4	2.0	100.0	147
7–9	5.5	13.3	50.9	27.1	1.4	1.8	100.0	218	4.2	9.6	51.0	26.8	5.9	2.5	100.0	239
10–12	1.7	16.8	44.0	31.0	3.9	2.6	100.0	232	1.3	11.6	37.3	41.3	6.2	2.3	100.0	225
All	10.2	19.9	41.7	23.0	3.1	2.1	100.0	846	5.6	14.8	43.8	28.3	5.7	1.8	100.0	883

We have presented Tables 9.9 and 9.10 to highlight the following major findings:

(1) There is a very striking regional difference with regard to the growth and physical development of infants (boys and girls). Infants at Calcutta were distinctly poorer in their growth as compared to those of Bombay and Madras. As between Bombay and Madras, the former was in a better position but the differences *between* these two regions were far less than the differences between either of them on the one hand and Calcutta on the other. Thus, for example, if we consider the overall percentage of boys below the 3rd percentile of the Harvard scale at the three Centres, as against 43.3% and 46.6% of such infants at Bombay and Madras respectively, there were as many as 61% of such infants at Calcutta.

(2) Table 9.8 would suggest that girls in all three Centres were not worse off than the boys; thus the percentages of girls below the 3rd percentile in the Harvard scale were less than those of boys at the three Centres. The 3rd percentile in the Harvard scale would roughly work out to slightly more than 80% of the 50th percentile. The Gomez's classification helps a further break-up and subdivision of infants falling below the 3rd percentile of the Harvard scale. Thus the cut-off point for Grade III of this classification is 60% of the 50th percentile. It will be seen from Table 9.9 that not withstanding the lower figures for overall percentage of girls below the 3rd percentile, the actual percentages of girls in Grade III of Gomez's classification were higher than those of boys at all the three Centres. This bears out the generally held view that in poor homes, girls more often than boys, become victims of severe malnutrition.

In Table 9.10, we set out data on growth in relation to house-hold income. As is to be expected, the growth performance of infants belonging to house-holds with higher income was distinctly better. The interesting information that emerges from this Table, however, is that the striking regional difference between Calcutta on the one hand and Madras and Bombay on the other, evident when *all* infants were considered, is largely narrowed down when infants from house-holds with higher income (of over Rs. 1000/- per mensem) are considered. It would thus appear that infants of the poorest income-groups, particularly those of house-holds with monthly incomes of less than Rs. 500/- at Calcutta are much worse off than infants of house-holds of similar incomes in Bombay and Madras. We had earlier seen that more mothers of poor income groups in Calcutta, and to a certain extent in Madras, found it necessary to introduce supplements even within the fourth month, suggesting that a higher proportion of poor mothers in Calcutta were unable to maintain exclusive lactation in early infancy. Also a fair proportion of mothers in Calcutta were exclusively breast-feeding their infants well beyond six months, which from the point of view of nutrition is as undesirable. To what extent these factors contribute to this difference and to what extent other factors including differences in the state of environmental hygiene in these three Centres are involved, are aspects for further consideration.

The third percentile of the Harvard scale could be considered the lowest limit of the normal standard range of growth; this corresponds roughly to about 80% of the 50th percentile, which is the cut-off point adopted as the lowest limit of normalcy in IAP's classification. Purely for the purpose of the present discussion, if we accept this criterion, it would follow that 30% to 35% of boys and 25% to 31% of girls below six months in Bombay, 36% to 41% of boys and 32% to 43% of girls in Madras and 54% to 62% of boys and 44% to 53% of girls in Calcutta were below this lowest limit of normalcy. Among infants beyond six months of age 43% to 53% of boys and 38% to 49% of girls in Bombay, 61% to 64% of boys and 48% of girls in Calcutta, and 47% to 54% of boys and 46% to 53% of girls in Madras were below the normalcy limit (Table 9.8). Among infants below six months of age, 1% to 3% of boys and 4% to 5% of girls in Bombay, 6% to 15% of boys and 4% to 16% of girls in Calcutta, and 2% to 5% of boys and 3%-8% of girls in Madras actually exhibited Grade III undernutrition as per Gomez's classification (Table 9.9).

Since we found that most infants are either exclusively breast-fed or breast-fed with some supplements in their early infancy, the reason for such

Table 9.10 — Growth status (Gomez standards) of infants by household income

Centre and household income p.m. (Rs.)	Percentage distribution of infants by growth status							
	Retardation grade							
	Excellent	Normal	I	II	III	NR	Total	N
Bombay								
300 or less	6.3	18.8	40.0	27.2	5.4	2.3	100.0	335
301–500	9.1	17.2	43.2	25.2	3.8	1.5	100.0	472
501–1000	11.8	19.9	43.6	21.2	2.3	1.2	100.0	638
1001+	12.8	24.2	45.6	12.2	4.0	1.2	100.0	329
NR	21.7	19.6	28.3	19.6	4.4	6.4	100.0	46
All	10.5	19.8	42.8	21.6	3.6	1.7	100.0	1820
Calcutta								
300 or less	2.6	11.6	36.2	32.7	11.6	5.3	100.0	508
301–500	3.6	11.0	44.4	26.1	10.0	4.9	100.0	390
501–1000	9.0	20.5	38.8	20.8	7.7	3.2	100.0	312
1001+	12.7	23.7	44.1	12.8	4.2	2.5	100.0	118
NR	10.2	12.2	32.7	28.6	6.1	10.2	100.0	49
All	5.4	14.5	39.7	26.3	9.4	4.6	100.0	1377
Madras								
300 or less	6.4	11.6	42.6	31.6	5.6	2.2	100.0	826
301–500	6.8	21.5	41.7	23.9	3.1	2.9	100.0	381
501–1000	9.2	22.0	41.9	22.0	4.0	0.9	100.0	346
1001+	14.0	26.2	45.7	10.4	2.4	1.2	100.0	164
NR	8.3	16.7	75.0	–	–	–	100.0	12
All	7.8	17.3	42.8	25.7	4.4	2.0	100.0	1729

a large proportion of these infants not attaining 'normal' growth requires consideration. The following possibilities arise : (1) that while the dietary intake as provided by breast milk with or without supplements is quite adequate, these infants are subject to repeated infectious episodes even in their early infancy; we saw earlier that even exclusively breast-fed infants living in poor environment, do not totally escape infections; the growth retardation in early infancy may thus be largely a manifestation of poor environmental sanitation. (2) many of the infants might have started with the disadvantage of low-birth weight because of poor maternal nutrition during pregnancy; (3) there could be considerable variability with respect to output of breast milk; thus while the 'average' output may be adequate, there could be high and low outputs at the two ends of the spectrum of lactation performance.

These considerations underscore the need for monitoring the growth-performance of individual children. While general advice based on average 'expected' performance may be justified in the organisation of community programmes, advice with respect to individual children must obviously be based on their observed growth performance.

The fact that with increasing income, there is better growth performance even in early infancy among exclusively breast-fed infants would suggest (a) that with improved income and consequent improved maternal nutrition, lactation performance could be better, (b) that improved income may also imply better environmental sanitation and less exposure to risks of infections which retard growth.

While the observation that a good proportion of infants in the Study exhibited a growth performance below the lowest limits of normalcy of the Harvard scale may be disturbing, we must also point to the brighter side. The fact that 60% to 70% of infants belonging largely to the poor income-groups living under the most unhygienic conditions with minimal or no health care were able to attain a growth level which equalled or even exceeded the lower limits of normal growth of affluent American infants living under privileged hygienic environments should provide satisfaction. The credit for this achievement must largely go to the salutary practice of breast-feeding which the poor women have not as yet given up. This finding offers hope that with improvement of maternal nutrition and environmental sanitation an even higher percentage of our poor children may attain a level of growth comparable to the best international standard.

So far, we have considered growth performance of infants at the three Centres without reference to their feeding practices. In Table 9.11 we present data on growth performance of infants in relation to their feeding practice. Here again we see an interesting, rather intriguing, regional difference. Exclusively breast-fed infants of Bombay and Madras were distinctly better off than those on supplements; at Calcutta however, infants receiving supplements besides breast milk or who had been completely weaned, were better off than those who were being exclusively breast-fed. Here again, we must remember that a very high proportion of infants at Calcutta were being exclusively breast-fed well beyond six months. The poorer growth performance of exclusively breast-fed infants may be partly due to this factor. As against this we find that the growth performance even in early infancy is generally poorer in Calcutta than in the other Centres suggesting that lactation performance in a proportion of mothers in Calcutta might not have been adequate to sustain optimal growth in early infancy.

Table 9.12 provides data regarding growth status of CM-fed and exclusively breast-fed infants at the three Centres, at the time of interview. We must make it clear that a very large proportion of infants in the CM and CC category were actually also receiving breast milk. CM/CC was only a supplement in most cases. They were certainly not exclusively on CM/CC. So, in this Table we are in effect comparing the results of exclusive breast-feeding with breast-feeding plus CM/CC. It will again be seen that exclusively breast-fed infants were distinctly better off than those of other groups at Bombay and Madras, but not at Calcutta.

Table 9.11 — Growth status (Gomez standards) of infants in relation to feeding practice at interview

Centre and feeding status at interview	Percentage distributation of infants by growth status							
	Excellent	Normal	Retardation Grade I	II	III	NR	Total	Sample Size (N)
Bombay								
B	13.8	22.2	39.7	19.2	3.3	1.8	100.0	698
BS	8.4	17.4	46.0	23.6	3.1	1.5	100.0	918
W	8.9	22.7	40.5	20.9	5.1	1.9	100.0	158
NB	7.1	21.4	35.7	21.5	14.3	–	100.0	42
Calcutta								
B	3.2	13.9	38.0	29.0	10.1	5.8	100.0	345
BS	6.2	14.6	40.3	25.6	18.6	4.7	100.0	942
W	5.0	16.7	41.7	25.0	11.6	–	100.0	60
NB	11.5	15.5	26.9	19.2	26.9	–	100.0	26
Madras								
B	15.3	20.1	40.8	19.3	1.9	2.6	100.0	419
BS	6.1	17.2	45.0	26.5	3.2	2.0	100.0	1026
W	3.5	14.8	40.8	30.0	9.6	1.3	100.0	230
NB	–	9.3	25.9	40.7	24.1	–	100.0	54

B Exclusively breast-fed, BS Breast-fed and given supplementary food, W Completely weaned, NB Never breast-fed.

In Table 9.13, we have provided detailed data regarding growth status of infants in relation to the use of commercial milk and exclusive breast-feeding in different socio-economic groups at the three Centres. It is interesting that even when the highest socio-economic group was considered, only 37% of exclusively breast-fed infants at Calcutta showed 'excellent' normal growth performance as against 51% and 58% of the same income-group in Bombay and Madras respectively, but we must once again point out that a majority of mothers in this so-called high income-group at all the Centres were certainly not affluent, and could have suffered from the effects of nutritional deprivation though not to the same extent as those of even poorer income groups. It will be seen that the growth status of infants exclusively breast-fed was distinctly superior to the CM-fed both at Bombay and Madras, but at Calcutta, infants receiving CM supplement over and above breast milk were marginally better off.

Why should the growth of infants of Calcutta be clearly poorer than those of similar income-groups at Bombay and Madras? Was the state of environmental hygiene at Calcutta far worse than at Bombay and Madras? Was the lactation performance of women at Calcutta poorer than that of their socio-economic counterparts of Bombay and Madras? Was it that 'poor women' of Calcutta investigated in this Study were actually poorer than those of Madras or Bombay; was their nutritional status poorer and was this reflected in poorer lactation? These are intriguing and important questions which have an important bearing on national policies for promotion of health and nutrition of infants.

We have also analysed our growth data according to the classifications proposed by IAP. We are not presenting those Tables here because the general messages and conclusions they convey are

Table 9.12 — Growth Status (Gomez standards) of CM-fed and exclusively breast-fed infants at the three Centres.

Centre and feeding status at interview	Sample size (N)	Percentage distribution of infants by growth status				
		Excellent	Normal	Retardation Grade		
				I	II	III
Bombay						
CM-fed	124	9.7	16.1	45.2	19.4	8.1
Exclusively breast-fed	678	14.2	22.6	39.4	18.9	3.2
Calcutta						
CM-fed	347	7.8	16.1	43.5	22.5	8.4
Exclusively breast-fed	349	3.4	14.0	37.8	28.9	10.0
Madras						
CM-fed	400	6.0	16.8	41.8	28.0	6.8
Exclusively breast-fed	409	15.2	20.3	40.8	19.6	1.7

CM : Commercial Milk.
The Percentages may not add upto 100.0 as NR Category is not presented in the Table

Table 9.13 — Growth status (Gomez standards) of CM-fed and exclusively breast-fed infants in different socio economic groups at the three Centres.

Socio economic status and feeding status at interview	Percentage distribution of infants by growth status														
							RetardationGrade								
	Excellent			Normal			I			II			III		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Low CM Fed	7.7	1.3	8.2	15.4	6.3	6.1	34.6	38.0	38.8	26.9	36.7	35.7	15.4	15.2	10.2
Exclusively Breast fed	10.1	1.5	10.8	19.8	9.2	17.3	36.6	38.8	42.2	26.0	32.1	25.4	4.9	11.2	2.7
Middle CM Fed	6.4	9.4	5.7	11.1	20.3	20.5	50.8	44.9	41.0	20.6	18.8	27.0	7.9	5.8	4.8
Exclusively Breast fed	13.5	5.8	18.2	25.7	22.3	23.3	42.4	35.9	37.1	14.8	23.3	16.4	2.3	7.8	0.6
High CM Fed	11.7	10.1	5.9	29.4	19.1	26.5	41.2	44.9	44.1	11.8	16.8	17.6	5.9	7.9	5.9
Exclusively Breast fed	28.3	10.5	30.3	23.0	26.3	27.3	33.8	36.8	33.3	12.2	15.8	9.1	2.7	10.5	–

Percentages may not add upto 100.0 as NR Category is not presented in the Table.
1. Bombay; 2. Calcutta; 3. Madras; *CM Commercial Milk.*

no different from those which we have already presented above.

Lactation performance in relation to socio-economic status : It may be surmised that a high proportion of mothers of the affluent section fail to exclusively breast-feed their infants, presumably even when their potential lactation performance is good. On the other hand, it is possible that the poor, because of sheer compulsions of economic necessity, exclusively breast-feed their infants; despite the fact that in a proportion of these mothers, lactation performance may not be adequate. Where women of the high socio-economic group choose to exclusively breast-feed their infants, the growth status of those infants was distinctly superior to that of exclusively breast-fed infants of the poorer groups. In Table 9.14 we have indicated the data in this regard.

The distinctly better growth status in exclusively breast-fed infants of the higher socio-economic group as compared to the poorer groups may be attributable to two factors: (1) environmental sanitation may be better in the higher income-group and thus environmental constraints on growth arising from poor sanitation may be less. (2) lactation performance may be better in the women of higher income-group because of their better nutritional status and better maternal diets. This latter possibility requires earnest consideration. If this explanation is valid, we will be justified in suggesting that the answer to the poor lactation performance of the women of the poorest income-groups at Calcutta (if this is established by further studies) would be a vigorous policy directed to improvement of maternal nutrition through nutrition supplements to mothers during the first 6 months of lactation in order to improve their lactation performance. This may yield better dividends than a policy of direct supplementation to the infant; it will also obviate the risks of infection attendant on supplementary feeding in early infancy.

Severe malnutrition in CM-fed infants: The prevalence of 'severe malnutrition as assessed by both Gomez's classification and IAP classification was higher in infants receving CM supplements than in the exclusively breast-fed presumably due to greater risks of infection attendant on CM use. In Table 9.15 we have set out the relevant data. The difference in the prevalence of severe malnutrition as between exclusively breast-fed and CM-fed infants is striking in Bombay and Madras in both low and middle income-groups. In Calcutta, however while severe malnutrition was less prevalent in exclusively breast-fed infants as compared to those on CM among the low income-groups, the difference was negligible in the middle income-groups.

Perhaps the most likely explanation is that at Calcutta the deleterious effects of poor environmental hygiene were so overwhelming as to obscure differences between different groups.

Table 9.14 — Growth status of exclusively breast-fed infants

	Percentage of infants with excellent or normal growth					
	Low Income Group		Middle Income Group		High Income Group	
	Gomez's	IAP	Gomez's	IAP	Gomez's	IAP
Bombay	29.8	57.3	39.2	69.0	51.4	72.9
Calcutta	10.7	36.2	28.1	57.5	36.8	57.9
Madras	28.1	64.4	41.5	71.1	57.6	75.8

Table 9.15 — Prevalence of severe malnutrition in poor income groups on exclusive breast-feds and on CM-feds

	Prevalence of severe malnutrition (Gomez's classification)	
	Low income	Middle income
Bombay		
Exclusively breast-fed	4.9	2.3
CM-fed	15.4	7.9
Calcutta		
Exclusively breast-fed	11.2	7.8
CM-fed	15.2	5.8
Madras		
Exclusively breast-fed	2.7	0.6
CM-fed	10.2	4.8

Chapter – 10

An Overview

In this Chapter, we briefly recapitulate some of the major findings in the Study and discuss practical steps for the promotion of wholesome infant-feeding practices in the country.

The major findings: (1) Our study shows that breast milk continues to occupy a place of pre-eminence in infant-feeding. Lactation failures are so rare as to be practically insignificant. Thus out of 1820 infants in Bombay, there were just 42 infants who were never breast-fed (2.3%), out of 1377 in Calcutta only 26 (1.9%) and out of 1729 infants in Madras only 54 (3.1%) were never breast-fed. The majority of these 'never-breast-fed' infants belonged to the highest income-group. Even these figures of 'never- breast-fed' infants may be an overestimate of true lactation failure because 11 of the 42 'never- breast-fed' infants in Bombay, 12 out of 26 in Calcutta and 15 out of 46 in Madras were not put to breast at all in the first instance. We may, therefore, conclude that breast-feeding is the near-universal practice, especially among the poor income-groups.

(2) Breast-feeding was maintained for long periods. Thus at the age of 12 months, more than 85% of infants at Bombay, more than 90% at Calcutta and more than 70% at Madras were still receiving breast milk.

However, these findings should not give room to the complacent conclusion that traditional breast-feeding practices remain undisturbed. There are disturbing danger signals which, if not heeded in time, could seriously worsen the current situation with respect to the health and nutrition of our infants.

(3) The practice of not putting the infant to breast within the first 24 hours and of discarding colostrum was widely prevalent especially at Bombay and Madras, and to a much less extent at Calcutta.

(4) The disturbing finding was that a high proportion of mothers did not (or could not) exclusively breast-feed their infants for even up to four months. Thus the percentage of exclusively breast-fed infants at the end of the fourth month had declined to 66% at Bombay, 35% at Calcutta and 45% at Madras.

(5) On the other hand, the undesirable practice of feeding infants only breast milk without any supplements beyond six months was also followed in a proportion of cases. Thus at the end of eight months, 21% of infants at Bombay, 14% at Calcutta and 9% at Madras were still exclusively on breast milk.

(6) 14% of all infants at Bombay, 36% at Calcutta and 42% at Madras had received supplements of commercial milk foods (CM). The use of CM was thus strikingly greater at Calcutta and Madras than at Bombay. CM had been started within the first month in 3% of infants at Bombay, 7% at Calcutta and 2% at Madras. These early CM users included the 'never-breast-fed' infants referred to above.

(7) There was evidence that more children born in hospitals — private or government — received CM and that health personnel had 'advised' CM to even poor families. Many health personnel, however, had also advised continued breast-feeding. CM users included many rural poor who could not have had access to health personnel.

(8) Commercial cereal foods (CC) were used as supplements to breast milk in 22% of infants at Bombay, 14% at Calcutta and 37% at Madras.

(9) As may be expected, the proportion of CM/CC users was much higher among the higher income-groups but since the poor constitute the vast majority of the population, when the actual numbers of CM users in the general population were considered, the great majority of users of commercial infant foods were the poor. Most of these latter had resorted to CM on the basis of such beliefs and considerations as "unique nutritious properties of CM", "convenience", etc. Obviously CM/CC enjoyed a prestige value in the eyes of the poor. After all they were the foods which rich women were using for their infants.

(10) CM/CC use was seen in a higher proportion of the metropolitan population, but the rural environs had not escaped their impact. 22% to 30% of all infants in the villages around the metropolitan cities were receiving CM/CC, showing that the use of these foods was by no means an urban elitist phenomenon. A good proportion of the poor families was spending more than 10% of their meagre income on commercial infant foods. Most of the poor were over-diluting CM and feeding it in unhygienic ways and this was reflected in a higher prevalence of severe grades of undernutrition in such children than in those exclusively on breast milk.

(11) It was gratifying that the overwhelming majority of CM/CC users were using these foods as supplements to breast milk and not as substitutes. Indeed, among the poorest section these foods were invariably given as supplements to breast milk and not as the sole food.

(12) Our studies thus indicate that while CM/CC might not (as yet) have totally supplanted breast milk among poor communities, they have established for themselves a substantial 'beach head' in the dietary patterns of even the poorest infants in the rural environs of the metropolitan cities. At present they are only 'sharing' a place with breast milk in the dietary of early infancy. With increased income-generation they could make further inroads and progressively erode the breast-feeding practice.

(13) Animal milk was the supplement of choice in all income-groups at Bombay but CM/CC were the preferred supplements at Calcutta and Madras among the higher income-groups. Even among the poorest, CM/CC were more widely used at Calcutta and Madras than at Bombay. Taking all Centres together, animal milk, at present, has apparently a slight edge over commercial milk foods among supplements of choice. However, commercial milk foods are running practically neck to neck with animal milk in this regard; if present trends continue, they may, before long, overtake animal milk and become the major supplement of choice. On the other hand, if special efforts are made to increase the availability of fresh animal milk and to discourage the use of commercial milk foods, fresh animal milk may further outstrip commercial milk foods to retain and improve its present first place among supplements to breast milk.

(14) A smaller proportion of exclusively breast-fed infants had suffered episodes of infection as compared to infants on supplements, especially CM. The difference in the incidence of gastro-intestinal disorders between exclusively breast-fed infants and those receiving CM/CC was significant. Thus it was clear that unhygienic use of CM/CC was taking its inevitable toll among the poor infants.

(15) Among infants less than six months of age, nearly a third at Bombay, just more than a third at Madras and nearly half at Calcutta had weights/age less than the lowest limit of normalcy on the Harvard scale. From 1% to 15% of infants below six months (1%-5% at Bombay to 6% to

15% at Calcutta, with Madras in between) exhibited what is generally referred to as Grade III undernutrition on the Gomez's scale. Exclusively breast-fed young infants showed better growth than infants receiving supplements of CM/CC over and above breast milk at Bombay and Madras. At Calcutta the growth status of infants was poor, both in exclusively breast-fed infants and in those receiving CC/CM supplements with breast milk, with the latter showing marginally better growth status. In the higher income-groups the growth status was distinctly better than in the corresponding low income-groups in all regions. Generally speaking, the growth status of infants at Calcutta was distinctly worse than those of Bombay and Madras.

(16) It was, on the other hand, gratifying that nearly 60% to 70% of infants at Bombay and Madras and 50% to 60% at Calcutta, despite most of them living in abject poverty and under highly unhygienic conditions, had attained in their early infancy a level of growth comparable to that of the best international standards of privileged North American children. The credit for this must largely go to the salutary practice of breast-feeding still widely in vogue among the poor.

(17) The two ends of the spectrum with respect to infant-feeding practices were represented by Bombay and Calcutta. The Bombay picture differed from the Calcutta picture in the following ways : (a) more intensive and extensive breast-feeding, (b) exclusive breast-feeding during early infancy in a much higher proportion of cases, (c) introduction of supplements before six months in a smaller proportion of infants, (d) much lower use of CM/CC as supplement, (e) much better growth, and much lower incidence of malnutrition in infants.

Comments

We will now address three important findings in the Study:

(A) Why do many women, who have traditionally relied on breast-feeding for rearing their infants, and who can hardly afford the expense of supplements, find it necessary to introduce supplements to breast milk well before six months?

(B) Why do poor people who can hardly afford commercial infant foods, and who certainly do not have the necessary facilities for their hygienic use, go in for them?

(C) What are the factors underlying the striking differences with respect to the level of lactation performance, use of CM/CC and growth status of infants as between Bombay and Calcutta?

These three questions may in fact be related and the answers to them may overlap; we will, therefore, deal with these questions together. We may admit, at the outset, that at present we do not have all the data necessary to permit categorical answers to these questions.

(1) As in the case of most physiological attributes, lactation performance may also be subject to individual variability and there may be a 'normal physiological range' with respect to daily output of breast milk. We may expect that where the health nutritional status of the mothers is normal, even women representing the lowest ends of the normal physiological range of lactation may be able to provide enough breast milk to meet the full needs of the growing infant in the early half of infancy. On the other hand, in situations where the mothers are subject to severe environmental stress, dietary deprivation and undernutrition, there may be an impairment of lactation. In the case of women with lactation performance in the upper levels of the normal range, despite reduction in output consequent on such impairment, the output may be adequate to meet the needs of the infants. On the other hand, in the case of those mothers already in the lowest levels of the normal range, such impairment could affect the output of breast milk to a point when it falls short of the levels of adequacy needed to sustain normal growth and development of the infant. We admit that we do not as yet have concrete evidence in favour of this hypothesis. In this Study, we did not investigate the actual output of breast milk. However, in the absence of clear

evidence to the contrary, the possibility that output of milk might indeed have been inadequate in a proportion of cases cannot be ruled out. We found many exclusively breast-fed infants showed growth-retardation even in early infancy. Such retardation need not necessarily imply inadequacy of breast milk output. It could be argued that such growth-retardation was due to repeated episodes of infection. The fact that infants receiving supplements did not have better growth status lends support to this argument.

Studies at the National Institute of Nutrition, Hyderabad, several years ago, had shown that among poor undernourished women, nutritional supplementation could increase the output of breast milk and increase the concentration of some vitamins but had no significant beneficial effect on protein concentration (Bibliography—53). Many women in this Study belonged to the poorest sections subsisting on around 2000 K Cal and around 40 g of protein daily. It will be reasonable to expect that the output of their breast milk can be significantly augmented through improvement of their diets and nutritional supplementation. We will, however, argue that irrespective of this consideration, there is a legitimate case for programmes designed to improve the nutritional status of nursing mothers.

(2) Mothers who believe (or who are persuaded to believe) that their infants are not thriving on breast milk alone will look for supplements. The choice of supplements will be naturally determined by advice from health personnel, family members and neighbours, the example set by privileged sections of the community and the prevailing value systems. Fresh animal milk may be expected to be the most obvious choice in early infancy. We understand that the availability of fresh milk in the Calcutta and Madras regions is lower than in Bombay; moreover, fresh milk in quantities needed for adequate supplementation is also expensive. Health personnel are not equipped, at present, with sufficient knowledge to offer practical advice as to how best locally available inexpensive habitual foods of the family can be used to supplement breast milk. Under the circumstances, it is not surprising that the poor go in for commercial infant foods in the belief that these foods are so 'nutritious', that they will do good to their babies even if fed in small quantities (more like tonics than foods). The current phenomenon of considerable sections of the poor going in for these foods and stretching them for weeks on end by feeding them in overdiluted form is the result.

(3) The reasons for the striking difference between the Bombay and Calcutta regions with respect to (a) growth status and morbidity profile of infants (b) lactation performance, (c) time of introduction of supplements, (d) use of CM/CC, can only be speculated upon. The two major possibilities could be : (1) that environmental sanitation in poor communities in the Calcutta region was far worse than in Bombay, and (2) that the poor women in the Calcutta region investigated in the Study were even poorer than those of Bombay; and that they were in a much worse nutritional state and were subsisting on much worse diets than those of Bombay and that consequently their lactation performance was poor. The follow-up studies which we are shortly undertaking in the two regions, will provide direct evidence on these possibilities. As far as we are aware, this is the first time that such a startling difference in the growth status of infants in the different regions of the country has ever been demonstrated on such a large scale.

In our present Study, we had unfortunately not included the Punjab region. But there have been some excellent recent observations on lactation performance of women in Punjab. Das and her colleagues (Bibliography—39) in Ludhiana in Punjab, had shown conclusively that "in spite of their disadvantages of poverty, poor diet, unhygienic surroundings and overwork" underprivileged mothers of Punjab were able to achieve a good state of nutrition for their infants through exclusively breast-feeding them for six months in the case of 90% of their male infants and 73% of their female infants. On the basis of these observations these workers had concluded :"From our experience we are certain that it is our duty to teach workers not to add to the tremendous burdens of the mothers of the under-privileged community by asking them to give anything other than breast milk for six months. Our duty is to motivate these mothers towards exclusive breast-feeding

throughout the first six months." The sample studied by Das *et al.* above was not strictly comparable to the samples investigated in the present Study, because Das *et al.* had included in their sample "only infants who had a favourable start, that is, full-term singletons with birth weights of 2.5 kg or more, and no congenital abnormalities and obvious birth trauma." They had also excluded 4.8% of mothers "who had failed to establish good lactation." Even allowing for the fact that Das *et al's* sample was thus a selected one, their observations suggest that lactation performance of the women of Punjab (even the underprivileged ones) is clearly superior to that of the poor women of Calcutta and Madras and perhaps even somewhat better than those of Bombay. This is another example of regional difference in lactation performance of women in the country.

There is the general impression that the women (even poor women) in the rural countryside of Punjab are much sturdier and stronger than the women of the poorest communities of Calcutta and Madras. They, like the women of Maharashtra (Bombay), do not belong to the "rice belt" of the country—the east and the south, where some of the worst ravages of malnutrition in the country are to be seen. Unfortunately, we do not have precise data on the anthropometric and nutritional status and dietary intakes of the nursing mothers in these different regions, which will help us decide to what extent regional differences in lactation performance are in fact related to differences in the mothers' health/nutritional status. Das *et al's* observations, however, clearly show that with good antenatal care and proper motivation, a high proportion of even under-privileged women can successfully exclusively breast-feed their infants for six months. Their observations indirectly underscore the need to ensure adequate nutritional status of the mother, good antenatal care and proper motivation so as to enable them to do so.

We do not believe that differences between Punjab, Maharashtra, Bengal and Madras are of ethnic origin because within each region we have instances of mothers who can exclusively breast-feed their infants for six months and some who cannot.

There is evidence of faltering of growth in a proportion of breast-fed infants in the early half of infancy; but there is also the same evidence of such faltering even in infants receiving supplements. Indeed, generally speaking among the poor income-groups, differences in growth status between the exclusively breast-fed and supplemented groups of infants within six months did not appear to be significant. Therefore, while we cannot rule out inadequate lactation as a factor responsible for growth faltering, it seems possible that this may not be the major factor. Repeated infectious episodes which are seen (though to a less extent) even in the exclusively breast-fed infants could be the major factor. If the latter is the case, supplementation may not correct the situations but may actually aggravate it. The theoretical benefit of early supplementation may be more than offset by greater risks of infection, with the result that at six months, the infant with supplementation may end up as no better, and perhaps even worse, than the one without it. A decision as to the timing of introduction of supplementation must be governed by an appreciation of the total context in which the infant is being reared. Under the circumstances, it may be prudent not to view minor degrees of growth faltering before six months as an indication for advising supplements. It may be the right strategy to motivate mothers to continue with exclusive breast-feeding for six months but such motivation must be accompanied by attempts to improve maternal diets through nutritional supplementation, where necessary. If, however, growth-retardation persists, then it must be presumed that breast milk is inadequate and supplements must be introduced.

Strategies for the promotion of wholesome infant-feeding practices

Taking into account the socio-economic and environmental conditions in which the vast bulk of our infants are being currently reared (and will continue to be reared for at least the next two decades) our National Policy with respect to ensuring health nutrition of our infants must squarely rest on the strategy of : (a) promotion of exclusive breast-feeding for the first six months of infancy, (b) introduction of such supplements as fresh animal milk and a judicious combination of food items

of the habitual family dietary such as cereals, *dhal* (legumes) and vegetables, after six months, while continuing breast-feeding as long as possible, (c) promotion of better hygiene, and cleanliness in the handling and feeding of foods of the infant, (d) education regarding avoidance of, and care during infections, and (e) regulating the use of commercial infant foods.

The implementation of the strategy proposed above will call for several steps, which we briefly enumerate here.

A. Support to mothers

(1) Improvement and sustenance of maternal nutrition : The complacent assumption that no matter how ill-nourished the mother is she will (and must) deliver the breast milk needed for her baby in adequate amounts must be given up. We have, so far, largely neglected what perhaps is the most important and crucial determinant of successful breast-feeding, namely, the state of maternal nutrition; if exclusive breast-feeding in early infancy and continued breast-feeding for the greater part of infancy have to be ensured, we cannot afford to neglect this aspect any more. In all "nutrition intervention" programmes directed to infants and children, it should be the policy that, where there is evidence of growth-retardation in the infants in early infancy, nutrition supplements must be provided to the mother and not to the infants and the effect on growth of the infant could be monitored. Only if it is found that such nutritional supplementation to the mother has not resulted in improvement of growth status of the infant should supplements be directly offered to the infant. If this policy is followed, the present practice of straightaway using any evidence of growth faltering in early infancy as an excuse or justification for introduction of CM/CC will be curbed. We welcome the policy of offering supplements to nursing mothers during the first six months of lactation that is now being followed in our I.C.D.S. programme.

(2) Subsidised foods for nursing women: The Government should earnestly consider a programme for providing at subsidised prices such items as fresh animal milk, bread and good-quality biscuits (see below), especially to nursing mothers belonging to the poorest income-groups. These items taken by the mothers *in addition to their habitual diets,* could help to augment the quality and quantity of maternal diet and of breast milk. If, in consonance with our Family Planning Policy, it is so desired, this facility may be limited to nursing mothers for the first and second living infants only. This step would, of course, call for considerable administrative competence, but programmes of far greater complexity have been successfully accomplished in other countries (the food distribution policy of Britain during the World War II is only one example). The questions here are: Do we consider this matter as of sufficient importance to mobilise the administrative machinery and competence needed for this purpose? Or do we wish to dismiss this as 'a game not worth the candle'?

(3) Provision of facilities for breast-feeding to working mothers: Employment of women in full-time occupations may not at present be a major factor in influencing infant-feeding practices in the country as a whole, for the reason that only a very small fraction of women in low income-groups and in rural areas are engaged in full-time occupations outside their own villages. The problem is now largely confined to a small proportion of women in urban areas. However, the situation could change in the next two decades with increasing employment opportunities for women. Women in rural areas around major cities may start commuting to their work-sites in nearby cities in increasing numbers; the practice of breast-feeding in early infancy will then come under great strain. Indeed this factor would turn out to be as much a threat to breast-feeding as the current aggressive unethical marketing practices of baby-food manufacturers. Under the pressure of their occupational needs, women will increasingly have to turn to 'convenience foods' and in such a situation baby-foods may not even need "aggressive" advertisements. Any policy for the promotion and fostering of the salutary practice of breast-feeding must take note of this possible emerging scenario in the field of infant-feeding within the next two decades.

There would appear to be only two major approaches towards meeting the possible threat to

breast-feeding likely to be posed by increasing employment opportunities to women: (1) provision of facilities to mothers for feeding their infants at work sites through the setting up of creches at work places; this may not always be possible. (2) extension of the duration of paid maternity leave to cover the major part of early infancy; (the current duration of maternity leave is too short to permit exclusive breast-feeding for the greater part of early infancy). Such a facility may be granted to working women of poor income-groups at least for their first and second infants. Extension of such facilities for infants of higher birth order may be viewed as a disincentive to limitation of family size and may not be in consonance with our current national policy.

The second approach may turn out to be more feasible and less expensive. It must be remembered that the provision of creches at work sites, in addition to expenses involved in their maintenance, does imply permission for partial absenteeism from actual work. The balance of advantage may thus be in extending the duration of maternity leave to cover the major part of early infancy.

(4) Education of would-be mothers: In an earlier publication (Gopalan C., "Home Science" And Vocational Training For Rural Girls - A Proposal, *Bull. Nut. Foundation of India* 5.1.5, 1984) an imaginative programme of education beamed to girls in rural areas (between 12 and 20 years of age) who are on the threshold of marriage had been suggested. Most of our girls in rural areas enter marriage and attain motherhood with no training in mothercraft and in total ignorance of wholesome infant and child rearing practices. The real key to successful infant rearing is the improvement of the knowledge and competence of mothers. They will then no longer be easy prey to tendentious advice and advertisements. We, therefore, reiterate the recommendation in the earlier publication referred to above.

B. Promoting use of supplements other than commercial infants foods

(1) Increasing the availability of animal milk in rural areas : Fresh animal milk at reasonable prices must be available to the poor. Our milk production policy must be such that it does not denude the rural areas of milk in order to feed the urban elite. Milk is, by no means, an unnecessary luxury for the poor infants; it is an essential food item especially in the context of the fact that the only inexpensive supplements that the poor can afford for their infants are cereals and to a certain extent pulses (these latter are getting increasingly beyond the reach of the poor). We will be doing a great deal to discourage the use of expensive commercial infant foods by the poor by making fresh animal milk easily available to them at reasonable prices.

(2) Use of inexpensive food items of the family diet: Inexpensive food items of the habitual family dietaries can be effectively used in judicious combinations as supplements for infants. Mothers should be encouraged to use these food items — like *'chapaties'* (wheat bread) dipped in hot tea (in Punjab) or rice, *dhal* (pulses) and vegetables mashed (in the rice belt). Health personnel must be provided manuals containing information regarding suitable supplements for infants based on local food items, which the mothers could use. When practical advice based on local conditions is offered (such advice is not offered at present) they may find acceptance. Vague advice will be of no value. In the absence of practical advice, mothers now turn to commercial infant foods. Home Science Colleges attached to Agricultural Universities in different States may be encouraged to prepare such manuals suitable for different regions.

(3) The training of health personnel: The health personnel, including doctors, require better practical training in the promotion of wholesome and feasible infant-feeding practices among poor communities than what they are at present receiving. When confronted by a poor woman seeking advice as to what she should feed to her baby which is not thriving on her breast milk, most of them today are in no position to give realistic advice. The theoretical knowledge which they have gained during their training proves to be of no avail when they are confronted with real-life situations. Under such circumstances, they often advise commercial infant foods — an advice which is not time-consuming and which is in consonance with what the affluent are practising. If health personnel

HEALTH

should not unwittingly become the allies of baby-food manufacturers due to such ignorance, we must improve their training and such training should be tailored to suit local situations and local dietary habits. The fact that some health personnel advise commercial foods to infants of families they come into contact with is, no doubt, a matter of concern. But fortunately the infants so advised, at present, constitute a tiny fraction of the population. What is more disturbing is that health personnel do *not advise the non-use* of commercial infant foods to the vast bulk of the rural poor, for the reason that (a) they do not reach them and (b) they are not equipped and trained to suggest practical and feasible alternatives to CM/CC under the real-life conditions in the field.

(4) Improvement of quality of biscuits in village shops: We have found in our Study that there was extensive use of biscuits in infant-feeding especially among the poorest sections of the population in Madras and Bombay and to a less extent at Calcutta. The biscuits used were from the village shops, and were the products of small-scale industry. (The good, elegant, highly priced biscuits of the large-scale manufacturers are of course for the urban elite and well beyond the reach of the rural poor). At present there is absolutely no effort at quality control and at ensuring reasonable nutritive value of these biscuits, which are in such wide use among the poor; the poor are not getting their money's worth. The organised large-scale sector in biscuit manufacture is apparently not interested in transfer of technology to the small-scale sector which caters to the poor infants and children of urban slums and villages. The Government must look into this question. By improving the quality and nutritive value of biscuits and offering them at subsidised rates to pregnant and nursing women and infants and children of the poor, we will be utilising a ready-made channel which is already in wide use in the countryside, for the betterment of the nutritional status of the poor. It must be remembered that the poor also stand in need of ready-to-eat 'convenience foods', which will help save time, energy and fuel and which will be a supplement to the family diet. There is no danger of biscuits displacing breast-milk (as CM/CC could) because they will be used only as supplements mostly in the latter half of infancy just as they are now being widely used.

C. Augmenting health services and improving environmental sanitation

(1) Increasing the outreach of health services: If infant morbidity has to be reduced and wholesome infant-feeding practices are to be promoted, we have to greatly increase the out-reach of our health services. At present, the majority of the rural poor do not have access to basic health care and so health personnel are in no position to influence infant-feeding practices or to mitigate infant morbidity in most of our rural areas. It is only when health services reach down to our villages that a programme of monitoring growth (and nutritional status) of infants and children would become possible and the effects of morbidity can be mitigated. The control of morbidity is only next in importance to promotion of breast-feeding in ensuring good nutrition for the infant, and health personnel can make a significant contribution in this regard.

(2) Safe water supply and sanitation : If we have to reduce the present high prevalence of morbidity in infancy and childhood, we must ensure basic sanitary facilities in our villages. In particular, safe water supply is an essential requisite. In the absence of safe water, any supplement could become a source of infection. It is unfortunate that a majority of our rural population do not have access to safe water supply.

D. Regulating use of commercial infant foods

(1) Education regarding superiority of breast milk over commercial infant foods: The urban elite constitute a tiny fraction of our population, but they are the trend-setters whom the poor envy and wish to emulate. The elite must be made fully aware of the overwhelming new evidence pointing to the clear superiority of breast milk over all baby foods; a vigorous movement for return to traditional breast-feeding must be initiated among the urban elite, and maintained with sustained tempo. The prestige and aura that now surround CM/CC must be dispelled. The poor will be suspicious of advice which smacks of double standards. If programmes to discourage commercial infant foods among the poor should command credibility and

make headway, they must be accompanied by parallel movements among the rich — somewhat on the lines of the movement in USA and Europe. We must ensure that CM/CC are not promoted in a manner which suggests that they are substitutes to breast milk not only among the poor but also among the affluent. At most they could be presented as just one of the possible supplements to breast milk. In that case the disadvantages and risks arising from their use by poor communities because of economic or environmental constraints must be pointed out. The poor should not be lured into using them by planting in them the belief that these foods have unique and precious nutritional properties, and will, therefore, benefit their infants in a manner which no other food within their reach can do.

(2) Implementation of the new Code: The Code recently adopted by the Government of India is good so far as it goes. Much would, however, depend on how it is implemented. We are distressed to find that despite the Code, some brands of commercial infant foods are still being promoted in a manner which suggests that the letter of the Code is being observed (in order to keep within law) but not the spirit. Multi-national baby-food manufacturers, goaded by the profit motive, may not be expected to summon the concern and care for the poor necessary to avoid unethical promotion of their products; it is, therefore, the responsibility and duty of the indigenous (national) baby-food manufacturer to set the highest standards in this regard and thus show the way. If indigenous manufacturers observe the highest standards of ethics, it will be easier for the Government to deal firmly with errant multi-nationals. A truly effective machinery for ensuring the rigid observance of the Code must be set up. Otherwise the entire exercise of drawing up the Code will become a mockery much like the statutory warning on the cigarette packets. The implementation of the Code cannot be left to government agencies alone (they could also sometimes become vulnerable). There must be a people's movement to ensure that the traditional practice of breast-feeding does not get eroded; consumer protection societies, voluntary agencies, the media and the enlightened lay public must take the lead and perform their watchdog duties in this regard.

(3) Enlisting support of the medical profession: The impressions that medical practitioners, paediatricians and health professionals in general tend to advise commercial infant foods too readily, and that there could be an unholy alliance between some of them and baby-food manufacturers, have tarnished the fair name of the profession. The latter allegation may, perhaps, be a bit too sweeping. However, without bothering about 'impressions', in the interests of child health/nutrition, neonatologists and paediatricians must take the lead in spearheading movements for fostering and promoting the traditional practice of breast-feeding. It is their participation that will lend such movements prestige and authenticity. We are of the firm view that the overwhelming majority of the medical profession are public-spirited, and dedicated to the cause of promotion of national health.

(4) Changing the hospital culture: The finding that delivery in hospitals, favours use of commercial infant foods is distressing. That in some hospitals at Bombay, infants were introduced to bottles of commercial milk immediately after birth, even before their mothers had had a chance to put them to breast, is shocking. Fortunately, we found that this practice was not widespread. Government hospitals are teaching centres where medical students and other health professionals are trained. The traditions and the precedents they set must be exemplary and designed to promote health. Consumer societies headed by enlightened paediatricians must bring such deleterious practices in our hospitals to public notice and governmental attention. We do not suggest punitive witch-hunts but a constructive movement designed to eradicate current unhealthy and unethical practices.

(5) Placing commercial infant foods in proper perspective: It will be bad strategy to resort to overkill by painting baby-foods as 'poisons'. Exaggerated statements and extreme positions may prove counter-productive. These foods have a place as just *one of several possible supplements* to breast milk in late infancy among those who have the means to afford them and the facilities to use these hygienically. But the poor must be disabused of the impression that these foods are unique, essential and could confer benefits which other much less expensive supplements cannot.

The potential harm that these foods can cause when unhygienically used, and the little nutritional benefit which they can provide when used in the small quantities which alone the poor can afford, must be highlighted by health professionals so that the poor are 'weaned away' from these foods.

The state of our infants and children is the true test of the state of our 'development'; it is also the most important determinant of our future. No national programme can be more important than the ones directed towards the betterment of their health and nutrition.

Selected bibliography

In this section, we have listed published studies on lactation and infant-feeding practices carried out in India. We do not claim that the list is exhaustive or complete.

1) Agarwal, D.K. Infant feeding practices and the environmental hazards during weaning, Baroda Jour. Nutr. 9 : 185-189, 1983.

2) Agarwal, D.K., Chandra, S., Bhatia, B.D., Sanyal, S.C., Agarwal, K.N. Bacteriology of weaning foods in some areas of Varanasi, Ind. Pediatr. 19: 131-134, 1982.

3) Agarwal, K.N., and Agarwal, D.K. Infant feeding in India, Ind. Jour. Pediatr. 48 (382): 285-288, 1981.

4) Anand, D., Rama Rao, A. Feeding practices of infants in Najafgarh area, Ind. Jour. Child Hlth. 11: 172-181, 1962.

5) Anand, R.K. The management of breast-feeding in a Bombay hospital, Assignment Children 55/56: 167-183, 1981.

6) Arora, D.D., Kaul, K.K. Feeding practices during the first five years among Central India communities, Ind. Pediatr. 40: 204, 1973.

7) Bafna, F., Parekh, P., Kaul, K.K. A study of attitudes of practising doctors to infant feeding, Ind. Pediatr. 11 (8): 563-566, 1974.

8) Bahl, L. Some aspects of infant rearing practices and beliefs of tribal inhabitants of Himachal Pradesh, Ind. Pediatr. 16 (4): 337-341, 1979.

9) Bahl, L., Singh, L. Some aspects of infant rearing practices and beliefs in rural inhabitants of Himachal Pradesh, Ind. Pediatr. 19(11): 921-925, 1982.

10) Bai, P.V.A., Leela, M., Subramaniam, V.R. Adequacy of breast milk for optimal growth of infants, Trop. Geogr. Med. 32: 158-161, 1980.

11) Bailur, A. Food consumption patterns of pre-school children in India, 1st Asian Congress of Nutrition, Hyderabad, : 256, 1971.

12) Bakshi, A.C., Bhandari, N.R. Assessment of nutritional status of pre-school children in Bhopal, Ind. Pediatr. 14(8): 615, 623, 1977.

13) Banik, D.N. Some observations on feeding practices, nutrition and growth of pre-school children in an urban community, Ind. Jour. Pediatr. 44: 139-149, 1977.

14) — A comparison of growth pattern of children from higher and lower socio-economic community, Arch. Ch. Health 22 (5): 97-103, 1980.

15) — Breast-feeding, weaning practices of pre-school children in urban community in Delhi, Ind. Pediatr. 12: 569-574, 1975.

16) Bansal, R.D., Gosh, B.N., Bhardwaj, U.D., Joshi, S.C. A survey of infant feeding and weaning practices at Simla Hills (Himachal Pradesh), Ind. Jour. Med. Res. 61: 1869-1875, 1973.

17) Belavady, B. Effect of protein supplementation to the nursing mothers on some milk constituents: Casein and Xanthine oxidase, Ind. Jour. Med. Res. 50: 100-103, 1962a.

18) — Nutritional and economic aspects of human milk, Proc. Nutr. Soc. India. 16: 29-34, 1974.

19) — Nutrition in pregnancy and lactation, Ann. Ind. Acad. Med. Sci. 12: 185-192, 1976.

20)— Nutrition in pregnancy and lactation, Ind. J. Med. Res. 57: 63-74, 1969.

21)— Lipid and trace-element composition of human milk, Acta Pediatr. Scand. 67: 566, 1978.

22)— Distribution of nitrogen in breast milk of Indian mothers, Ind. Jour. Med. Res. 47: 217-221, 1959.

23)— Quantity and composition of breast milk in malnourished mothers, in 'Symposia of the Swedish Nutrition Foundation, V.14: The Mother/Child – Nutritional aspects', ed. by Leif Hambraeus and Stig Sjolin, Sweden, Almqvist & Wiksell: 62-68, 1979.

24)— WHO Collaborative Study on breast-feeding: Country Report – India 05. Sept. 1975-Mar. 1976, Hyderabad, National Institute of Nutrition, 1980.

25)— Xanthine oxidose and alkaline phosphatase activity in the breast milk of poor Indian women, Ind. Jour. Med. Res. 48: 654-660, 1960.

26)— Dietary supplementation and improvements in the lactation performance of Indian women, In 'Maternal Nutrition during pregnancy and lactation', ed. by Hugo Aebi and Roger Whitehead. (A Nestle Foundation Workshop Lutry/Lausanne, April 26th and 27th 1979). Bern, Hans Huber Publ: 264-273, 1980.

27)— Riboflavin requirement of nursing mothers, Ind. Jour. Med. Res. 50: 104-107, 1962b.

28) Belavady, B., Gopalan, C. Chemical composition of human milk in poor Indian women, Ind. Jour. Med. Res. 47: 234-245, 1959.

29)— Effect of dietary supplementation on the composition of breast milk, Ind. Jour. Med. Res. 48: 518-523, 1960.

30) Belavady, B., Pasricha, S., Kalpakam, S. Studies on lactation and dietary habits of the Nilagiri Hill Tribes, Ind. Jour. Med. Res. 47: 221-233, 1959.

31) Belavady, B., Udayasekhara Rao, P. Proteins in human milk, Ind. Jour. Biochem. 2: 277-278, 1965.

32) Belavady, B., Venkatachalam, P.S., Gopalan, C. Effect of protein supplementation on creatine concentration of human milk, Ind. Jour. Med. Res. 49: 301-305, 1961.

33) Bhandari, N.R., Patel, G.P. Dietary and feeding habits of infants in various socio-economic groups, Ind. Pediatr. 10(4): 233-238, 1973.

121) Narayanan, I., Prakash, K., Verma, R.K., Bala, S., Gujral, V.V. Partial supplementation with expressed breast milk in the prevention of infection in low-birth-weight infants, Lancet, ii: 561-563, 1980.

122) Narayanan, I., Puri, R.K., Dhanabalan, Prasada Rao, G.C.B., Annamma, F., Balakrishnan, S. Some feeding practices, in a rural area in Pondicherry, Ind. Pediatr. 11: 667-671, 1974.

123) Narula, P., et al. Cellular and humoral factors of human milk in relation to nutritional status of lactating mothers, Ind. Jour. Med. Res. 76: 415-423, 1982.

124) Nath, M., Geervani, P. Diet and nutrition of pregnant and Lactating women and infants of Urban Slums of Hyderabad, Ind. Jour. Nutr. and Diet. 5 (12) : 422-428, 1978.

125) Nawal, A.S. Social factors operating in feeding practices and dietary pattern of under threes, Ind. Pediatr. 18: 453-460, 1981.

126) Paneur, S. Breast-feeding in Nepal: Religious and cultural beliefs, Baroda Jour. Nutr. 9 : 180-184, 1983.

127) Pasricha, S.A. Survey of dietary intake in a group of poor, pregnant and lactating women, Ind. Jour. Med. Res. 46, 605-609, 1958.

128) Patel, R.B., et al. Breast milk in low weight babies, Ind. Jour. Pediatr. 48 (391) : 195-199, 1981.

129) Patodi, R.K., Tiwari, S.G., and Mathur, L.K. Infant-feeding practices in urban and rural areas in Madhya Pradesh, Ind. Jour. Pediatr. 43: 333-346, 1976.

130) Pereira, S.M., et al. Infant-feeding trials with a weaning food supplement, Food Sci. Technol. 8: 113-116, 1971.

131) Prasad, K.R., Nath, L.M. A controlled study of socio-culturally determined child-feeding habits in relation to protein-calorie malnutrition, Ind. Pediatr. 13: 169-176, 1976.

132) Prema, K. Pregnancy and lactation: Some nutritional aspects, Ind. Jour. Med. Res. 68(suppl.): 70-79, 1978.

133) — Duration of lactation and return of menstruation in lactating women using hormonal contraception and IUDs, Contraceptive Deliv. Syst. 3: 39-46, 1982.

134) Prema, K., Philips, F.S. Lactation Amenorrhoea – A survey, Ind. Jour. Med. Res. 71: 538-546, 1981.

135) Prema, K., et al. Lactation and Fertility, The American Jour. Clin. Nut., 32:1298-1303, 1979.

136) Puri, I.N., et al. Some infant feeding and weaning practices in rural community, Pondicherry. Ind. Pediatr. 11: 667-671, 1974.

137) Puri, R.K., Khanna, K.K., Ashok Kumar, G., and Prasada Rao, D.C.V. Infant-feeding and child rearing methods in Pondicherry, South India, Ind. Jour. Pediatr. 43: 323-332, 1976.

138) Puri, R.K., Kumar, A.G., Khanna, K.K., Rao, P.D.C.V. Infant-feeding and its effect on growth and development of children, Ind. Jour. Pediatr. 43: 361-367, 1976.

139) Rajalakshmi, R. Lactation performance as a function of nutrition and social class. In 'Breast-feeding and food policy in a hungry world' ed. by D. Raphael, New York, Academic Press, 183-188., 1979.

140) Ramasastri, B.V. Folate activity in human milk, Brit. Jour. Nutr. 19: 581-586, 1966.

141) Rao, D.C.V.P. A study of social aspects of child health in the slum community of Pondicherry, Ind. Jour. Pediatr. 39, 311-316, 1972.

142) Rao, P.T. Customs of infant-feeding in South India, Ind. Jour. Child Health, 347-352, 1957.

143) Reddy, V., et al. Immunology of human milk in relation to maternal nutrition, Baroda Jour. Nutr. 9, 72-76, 1982.

144) Roy, J.K., Roy, B.C. Nutritional background and growth of infants, A major district of West Bengal, Calcutta, Anthropological Survey of India, Govt. of India, 1969.

145) Sanghvi, T.G. Programming alternatives in human lactation, Maternal child health programmes of care in India, In 'Breast-feeding and food policy in a hungry world' (N.Y.), 277-285, 1979.

146) Saran, M., Gaur, S.D., Verma B.L., Arunkumar. An epidemiological study of diarrhoea amongst children under five years of age in a slum community, Ind. Pediatr, 16 (1): 33-39, 1979.

147) Saroja, K. Breast milk is the best, Swasth Hind 25(2) : 46-47, Feb 1981.

148) Sehat (Journal), Breast-feeding, Sehat 9(12): 28-29, 1982.

149) Seth, V., Ghai, O.P. Feeding habits of infants and pre-school children in urban semi-urban and rural community, Indian Pediatr. 8: 452-453, 1971.

150) Saxena, S., Garg, O.P. A study of methods used for child rearing in Bikaner, Ind. Jour. Pediatr. 35 (246) : 342-349, 1968.

151) Shah, P.M., Nair, S.S. Physical growth of infants on vegetable based infant food, Ind. Pediatr. 15: 133-141, 1978.

152) Shah, P.M., Walimbe, S.R., Dhole, V.S. Wage earning mothers, mother-substitutes and care of the young children in rural Maharashtra, Ind. Pediatr. 16 (2) : 167-173, 1979.

153) Shankar, K. The dietary intake and nutritional status of pregnant and nursing women in Hyderabad, Ind. Jour. Med. Res. 50: 113-119, 1962.

154) Sharma, D.B., Lahori, U.C. Some aspects of infant rearing practices and beliefs in the urban and rural areas of Jammu (Kashmir). Ind. Pediatr., 14: 511-518, 1977.

155) Sharma, P., Siddher, C.M.S., Prasad, B.G. Feeding pattern and nutritional status of children under five years in an urban area, Ind. Pediatr. 9 (9): 532-539, 1972.

156) Sharma, V., Sharma, R., Purohit, B.K. A study of feeding and weaning pattern in Sindhi children below 5 years in an urban area, Ind. Jour. Pediatr. 44: 115-120, 1977.

157) Shukla, R.S., Bhambar, S.S., Bhandare, N.R. A study of superstitions and practices on under fives, Ind. Pediatr. 16: 403-408, 1979.

158) Sidhu, L.S., Grewal, R., Bhatnagar, D.P. A Study of physical growth in breast-fed male infants, Ind. Jour. Pediatr. 48 (390): 75-79, 1981.

159) Singh, R., Mishra, V.N., Agarwal, K.L., Mathur, J.S. Weaning practices of infants in rural and urban areas, Ind. Med. Gaz. 14, 152-154, 1974.

160) Srikantia, S.G. Nutritional problems during the weaning period. In 'Nutrition and Food Science : Present knowledge and utilization' V.3-Nutritional biochemistry and pathology. (Proc. eleventh International Congress on Nutrition, held in Rio de Janeiro, Brazil, August 27-Sept. 21, 1978 ed. by Walter Santos and others), New York, Plenum Press, 625-631, 1980.

161) Sudarshan, K., et al. Inter-relationship of breast-feeding and educational status in lactational amenorrhea, Ind. Jour. Gynecol. Obstet. 20 (4): 269-272, 1982.

162) Suvarna Devi, P., Behera, P.L. A study of breast feeding practices in South Orissa, Ind. Pediatr., 17: 753-756, 1980.

163) Taylor, C.E., et al. The Narangwal experiment on interactions of nutrition and infections : I, Project design and effects upon growth, Ind. Jour. Med. Res. (Supplement) 68: 1-54, 1978.

164) Thimmayamma, B.V.S., Parvathi Rau. Breast-feeding and infant-feeding practices in urban and rural areas, Baroda J. Nutr. 9: 168-175, (also appeared in 'International Workshop on Nutrition and the development of the child' ed. by R. Rajalakshmi, Baroda, M.S. University of Baroda), 1982.

165) Thimmayamma, B.V.S., Vidyavati, M., Belavady, B., Infant-feeding practices of working-mothers in an urban area, Indian Jour. Med. Res. 72: 834-839, 1980.

166) Thoman, O.P., Anand, H.L., Monhas, R.S. A review of feeding habits of infants and children in Kashmir, Ind. Pediatr. 1 (11) 428-435, 1964.

167) Thoman, O.P., and Manchanda, S.S. Child-rearing practices in Punjab, Ind. Jour. Pediatr. 35: 334-351, 1968.

168) Udaysekhara Rao, P. Proteins in human milk and creatinine metabolism during lactation, Ph.D. Thesis, Osmania University, Hyderabad, 1971.

169) Udayasekhara Rao, P., and Belavady, B. Protein fractions in human milk, I. Effect of duration of lactation and dietary supplementation in protein fractions, Ind. Jour. Med. Res. 55: 174-178, 1967.

170) Vidhyasagar, D. Is breast milk good for premies? Ind. Jour. Pediatr. 48 (391): 201-202, 1981.

171) Walia, B.N.S., and Gambhir, S.K. The relationship between childhood malnutrition and maternal knowledge and beliefs regarding nutrition, Ind. Pediatr. 12 (7): 563-568, 1975.

172) Walia, B.N.S., Gambhir, S.K., and Bhatia, U. Breast-feeding and weaning practices in an urban population, Ind. Pediatr. 11 (2): 111-133, 1974.

173) Yunus, M., Sinha, S.N. Social customs and beliefs in relation to child illness, pregnancy and child birth, infant feeding and child weaning – a rural study. Ind. Med. Gaz. 17: 284-289, 1977.

121) Narayanan, I., Prakash, K., Verma, R.K., Bala, S., Gujral, V.V. Partial supplementation with expressed breast milk in the prevention of infection in low-birth-weight infants, Lancet, ii: 561-563, 1980.

122) Narayanan, I., Puri, R.K., Dhanabalan, Prasada Rao, G.C.B., Annamma, F., Balakrishnan, S. Some feeding practices, in a rural area in Pondicherry, Ind. Pediatr. 11: 667-671, 1974.

123) Narula, P., et al. Cellular and humoral factors of human milk in relation to nutritional status of lactating mothers, Ind. Jour. Med. Res. 76: 415-423, 1982.

124) Nath, M., Geervani, P. Diet and nutrition of pregnant and Lactating women and infants of Urban Slums of Hyderabad, Ind. Jour. Nutr. and Diet. 5 (12) : 422-428, 1978.

125) Nawal, A.S. Social factors operating in feeding practices and dietary pattern of under threes, Ind. Pediatr. 18: 453-460, 1981.

126) Paneur, S. Breast-feeding in Nepal: Religious and cultural beliefs, Baroda Jour. Nutr. 9 : 180-184, 1983.

127) Pasricha, S.A. Survey of dietary intake in a group of poor, pregnant and lactating women, Ind. Jour. Med. Res. 46, 605-609, 1958.

128) Patel, R.B., et al. Breast milk in low weight babies, Ind. Jour. Pediatr. 48 (391) : 195-199, 1981.

129) Patodi, R.K., Tiwari, S.G., and Mathur, L.K. Infant-feeding practices in urban and rural areas in Madhya Pradesh, Ind. Jour. Pediatr. 43: 333-346, 1976.

130) Pereira, S.M., et al. Infant-feeding trials with a weaning food supplement, Food Sci. Technol. 8: 113-116, 1971.

131) Prasad, K.R., Nath, L.M. A controlled study of socio-culturally determined child-feeding habits in relation to protein-calorie malnutrition, Ind. Pediatr. 13: 169-176, 1976.

132) Prema, K. Pregnancy and lactation: Some nutritional aspects, Ind. Jour. Med. Res. 68(suppl.): 70-79, 1978.

133) — Duration of lactation and return of menstruation in lactating women using hormonal contraception and IUDs, Contraceptive Deliv. Syst. 3: 39-46, 1982.

134) Prema, K., Philips, F.S. Lactation Amenorrhoea – A survey, Ind. Jour. Med. Res. 71: 538-546, 1981.

135) Prema, K., et al. Lactation and Fertility, The American Jour. Clin. Nut., 32:1298-1303, 1979.

136) Puri, I.N., et al. Some infant feeding and weaning practices in rural community, Pondicherry. Ind. Pediatr. 11: 667-671, 1974.

137) Puri, R.K., Khanna, K.K., Ashok Kumar, G., and Prasada Rao, D.C.V. Infant-feeding and child rearing methods in Pondicherry, South India, Ind. Jour. Pediatr. 43: 323-332, 1976.

138) Puri, R.K., Kumar, A.G., Khanna, K.K., Rao, P.D.C.V. Infant-feeding and its effect on growth and development of children, Ind. Jour. Pediatr. 43: 361-367, 1976.

139) Rajalakshmi, R. Lactation performance as a function of nutrition and social class. In 'Breast-feeding and food policy in a hungry world' ed. by D. Raphael, New York, Academic Press, 183-188., 1979.

140) Ramasastri, B.V. Folate activity in human milk, Brit. Jour. Nutr. 19: 581-586, 1966.

141) Rao, D.C.V.P. A study of social aspects of child health in the slum community of Pondicherry, Ind. Jour. Pediatr. 39, 311-316, 1972.

142) Rao, P.T. Customs of infant-feeding in South India, Ind. Jour. Child Health, 347-352, 1957.

143) Reddy, V., et al. Immunology of human milk in relation to maternal nutrition, Baroda Jour. Nutr. 9, 72-76, 1982.

144) Roy, J.K., Roy, B.C. Nutritional background and growth of infants, A major district of West Bengal, Calcutta, Anthropological Survey of India, Govt. of India, 1969.

145) Sanghvi, T.G. Programming alternatives in human lactation, Maternal child health programmes of care in India. In 'Breast-feeding and food policy in a hungry world' (N.Y.), 277-285, 1979.

146) Saran, M., Gaur, S.D., Verma B.L., Arunkumar. An epidemiological study of diarrhoea amongst children under five years of age in a slum community, Ind. Pediatr, 16 (1): 33-39, 1979.

147) Saroja, K. Breast milk is the best, Swasth Hind 25(2) : 46-47, Feb 1981.

148) Sehat (Journal), Breast-feeding, Sehat 9(12): 28-29, 1982.

149) Seth, V., Ghai, O.P. Feeding habits of infants and pre-school children in urban semi-urban and rural community, Indian Pediatr. 8: 452-453, 1971.

150) Saxena, S., Garg, O.P. A study of methods used for child rearing in Bikaner, Ind. Jour. Pediatr. 35 (246) : 342-349, 1968.

151) Shah, P.M., Nair, S.S. Physical growth of infants on vegetable based infant food, Ind. Pediatr. 15: 133-141, 1978.

152) Shah, P.M., Walimbe, S.R., Dhole, V.S. Wage earning mothers, mother-substitutes and care of the young children in rural Maharashtra, Ind. Pediatr. 16 (2) : 167-173, 1979.

153) Shankar, K. The dietary intake and nutritional status of pregnant and nursing women in Hyderabad, Ind. Jour. Med. Res. 50: 113-119, 1962.

154) Sharma, D.B., Lahori, U.C. Some aspects of infant rearing practices and beliefs in the urban and rural areas of Jammu (Kashmir). Ind. Pediatr., 14: 511-518, 1977.

155) Sharma, P., Siddher, C.M.S., Prasad, B.G. Feeding pattern and nutritional status of children under five years in an urban area, Ind. Pediatr. 9 (9): 532-539, 1972.

156) Sharma, V., Sharma, R., Purohit, B.K. A study of feeding and weaning pattern in Sindhi children below 5 years in an urban area, Ind. Jour. Pediatr. 44: 115-120, 1977.

157) Shukla, R.S., Bhambar, S.S., Bhandare, N.R. A study of superstitions and practices on under fives, Ind. Pediatr. 16: 403-408, 1979.

158) Sidhu, L.S., Grewal, R., Bhatnagar, D.P. A Study of physical growth in breast-fed male infants, Ind. Jour. Pediatr. 48 (390): 75-79, 1981.

159) Singh, R., Mishra, V.N., Agarwal, K.L., Mathur, J.S. Weaning practices of infants in rural and urban areas, Ind. Med. Gaz. 14, 152-154, 1974.

160) Srikantia, S.G. Nutritional problems during the weaning period. In 'Nutrition and Food Science : Present knowledge and utilization' V.3-Nutritional biochemistry and pathology. (Proc. eleventh International Congress on Nutrition, held in Rio de Janeiro, Brazil, August 27-Sept. 21, 1978 ed. by Walter Santos and others), New York, Plenum Press. 625-631, 1980.

161) Sudarshan, K., et al. Inter-relationship of breast-feeding and educational status in lactational amenorrhea, Ind. Jour. Gynecol. Obstet. 20 (4): 269-272, 1982.

162) Suvarna Devi, P., Behera, P.L. A study of breast feeding practices in South Orissa, Ind. Pediatr., 17: 753-756, 1980.

163) Taylor, C.E., et al. The Narangwal experiment on interactions of nutrition and infections : I, Project design and effects upon growth, Ind. Jour. Med. Res. (Supplement) 68: 1-54, 1978.

164) Thimmayamma, B.V.S., Parvathi Rau. Breast-feeding and infant-feeding practices in urban and rural areas, Baroda J. Nutr. 9: 168-175, (also appeared in 'International Workshop on Nutrition and the development of the child' ed. by R. Rajalakshmi, Baroda, M.S. University of Baroda), 1982.

165) Thimmayamma, B.V.S., Vidyavati, M., Belavady, B., Infant-feeding practices of working-mothers in an urban area, Indian Jour. Med. Res. 72: 834-839, 1980.

166) Thoman, O.P., Anand, H.L., Monhas, R.S. A review of feeding habits of infants and children in Kashmir, Ind. Pediatr. 1 (11) 428-435, 1964.

167) Thoman, O.P., and Manchanda, S.S. Child-rearing practices in Punjab, Ind. Jour. Pediatr. 35: 334-351, 1968.

168) Udaysekhara Rao, P. Proteins in human milk and creatinine metabolism during lactation, Ph.D. Thesis, Osmania University, Hyderabad, 1971.

169) Udayasekhara Rao, P., and Belavady, B. Protein fractions in human milk, I. Effect of duration of lactation and dietary supplementation in protein fractions, Ind. Jour. Med. Res. 55: 174-178, 1967.

170) Vidhyasagar, D. Is breast milk good for premies? Ind. Jour. Pediatr. 48 (391): 201-202, 1981.

171) Walia, B.N.S., and Gambhir, S.K. The relationship between childhood malnutrition and maternal knowledge and beliefs regarding nutrition, Ind. Pediatr. 12 (7): 563-568, 1975.

172) Walia, B.N.S., Gambhir, S.K., and Bhatia, U. Breast-feeding and weaning practices in an urban population, Ind. Pediatr. 11 (2): 111-133, 1974.

173) Yunus, M., Sinha, S.N. Social customs and beliefs in relation to child illness, pregnancy and child birth, infant feeding and child weaning – a rural study. Ind. Med. Gaz. 17: 284-289, 1977.

Appendix

Why breast milk is better than formula baby foods

By

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This paper was written by the author at the request of the Ministry of Social Welfare, Government of India, for use by the Ministry. The Ministry was keen that the latest information pointing to the unique properties of human milk should be widely disseminated to the enlightened lay public. This article was beamed to the urban elite – the trendsetters. It has been reproduced here as it appeared relevant to the present Study.

In the long history of mankind, spread over several centuries, the practice of bottle-feeding of infants with milk formulas (baby foods) is a very recent development. This had its origin in the affluent countries of the industralised West barely 60 years ago. It is doubtful if this practice could have grown to its present dimensions if all that we know today about the unique and inimitable qualities of breast milk was known earlier.

Recent findings

Why breast-feed? Recent researches have have thrown a great deal of new light on the chemical and biological properties of breast milk, and have clearly established its superiority over all milk formulas in the promotion of growth, health and development of children. Unlike milk formula foods which are inert and have a fixed composition, breast milk is a dynamic "living fluid," specially adapted to the infant, its composition and output changing with the changing needs of the infant. There are changes in its composition over a period of time, during the day, and indeed even during the course of a single feed. For example, the fat content of breast milk is low at the start of a feed and gradually builds up to its peak value towards the end. Colostrum, secreted during the first five days after delivery, has a different composition from that of mature milk. It is lower in fat but richer in proteins and has a higher concentration of antibodies which protect against infections. It is also a richer source of zinc and vitamin A (which can be stored in the infant's liver). Zinc and vitamin A are now known to have profound influence on immunological mechanisms concerned in resistance to infections. By not putting the infant to the breast immediately after delivery, the infant is denied these benefits.

Breast milk gradually attains its 'mature' state with respect to composition and output by the fourth to the sixth week after delivery. The daily output of milk varies depending on the frequency of the feeds and the force of sucking by the infant : thus, within limits, the more hungry the infant the greater the output. The proteins of breast-milk, unlike those of formula foods, contain a relatively low proportion of casein, resulting in softer curd, easier digestibility and less likelihood of constipation; the lactose is high and helps to maintain low electrolyte concentration; the fat contains high levels of essential unsaturated fatty acids (linoleic acid), and also provides vitamin E (also concerned in defence against infections). The calcium, iron and zinc in breast milk are much better absorbed than the same elements in milk formulas. The sodium content is lower; this is important because the kidneys of the new-born cannot deal with a heavy load of solute. The stools of the breast-fed infant, unlike of those on baby/foods, are acidic due to high concentration of lacto-bacilli, and this helps to inhibit fungal infection. Thus the chemical composition of breast milk, unlike that of baby foods, is specially adapted to the physiology of the infant.

Breast milk contains a wide range of anti-infective substances including white cells (lymphocytes) and antibodies (secretory immunoglobulins). The latter protect the absorbing surfaces of the infant's intestines (intestinal mucosa) against such deadly bacterial infections as E. Coli, Shigella and Salmonella, and Rota Virus infections, which are mostly responsible for infantile diarrhoeas and deaths. There are also antibodies against polio virus and influenza virus, certain other respiratory (lung) viruses, and against organisms concerned in meningitis and middle-ear disease (ottitis media). The antibodies in breast milk are those produced in response to infections which the mother is exposed to in her environment. Thus the profile of antibodies in a mother's milk is specifically designed to protect her infant against the infections prevalent in its given environment — another example of how the composition of breast milk is tailored to the special needs of the infant. Formula foods do not contain these protective antibodies; and not all the money in the world can buy them.

The current Indian scene

Fortunately, in India today the great majority of our rural women have not, as yet, discarded breast-feeding. In fact, they generally breast-feed their infants for durations extending to 18 months or more. This is the brightest feature of India's current nutrition scene, and this would, incidentally, show that "lactation failure" in the affluent is largely due to psychological rather than organic causes. The problems of infant mortality and protein-calorie malnutrition will be far worse than what they are today but for this valuable asset. While commercial baby foods have not as yet, made significant in-roads into the interior rural areas of the country, the poor and middle-income-groups in the cities, urban slums, small towns and in the periurban rural areas have apparently not been so fortunate and have not been spared.

In the conditions prevailing among our poor communities, exclusive breast-feeding for the first six months yields optimal results with regard to growth and development. As a general rule, supplements need to be introduced only after six months. The supplements can consist of the habitual food items of the family – cereals, pulses and vegetables prepared and fed appropriately and hygienically, and, if necessary, top-feed of cow's milk. Even after such supplements are introduced, breast- feeding must continue as long as possible. Experience in Ludhiana has shown that with such a regimen normal growth can be ensured even in the poorest children.

There are several myths about breast-feeding and formula foods prevalent among the affluent sections of our society. One such is the belief that breast-feeding is "not good for the figure". Actually breast-feeding through helping the women to shed the extra fat she stores during pregnancy, will help improve her figure. Another myth is that formula foods contain special substances which breast milk does not, and so build bonnier babies; indeed, as mentioned earlier, formula foods cannot even fully substitute for breast milk, let alone excel it.

It is not surprising, therefore, that diarrhoeas,

respiratory infections and deaths are far less common in breast-fed infants than in the bottle-fed. A study in Haryana showed that the incidence of diarrhoeas in bottle-fed babies was three times higher than in the breast-fed. Dehydration resulting from diarrhoea, was also more severe in the bottle-fed infants. A study from another developing country showed that bottle-fed infants were hospitalised with infectious diseases ten times more often, and spent ten times more time in a hospital in their first year than fully breast-fed infants. Even in a developed country (USA), it has been reported that of 107 infants belonging to the middle-income-group admitted to the hospital with acute diarrhoea in a given period, only one infant was breast-fed. In a London hospital, while 14% of the infants in the community served by the hospital were being breast-fed, only two of 608 infants admitted to the hospital with diarrhoea were breast-fed. The protective effect of breast-milk against infections both in poor and affluent societies, has thus been well documented. In fact attempts have even been made to prevent and treat outbreaks of diarrhoeas in bottle-fed infants by feeding them breast milk. Breast milk also has antibodies which protect the infant against allergy, again by insulating the intestinal mucosa from the allergens (agents of allergy) in the gut.

Quality of breast milk

What is gratifying in our context is that, with respect to the concentration of protein, fat, lactose, calcium, and anti-infective and anti-allergic antibodies, there are no differences between the breast milk of poor and affluent mothers. The quantity and concentration of some vitamins in the breast milk of poor mothers, can, however, be further improved by improving the maternal diets. The cost of such improvement which will improve the health and nutritional status of both the mother and her infant will be a very small fraction of the cost of bottle-feeding baby foods.

Breast-feeding also promotes better 'bonding' (attachment between mother and infant) conducive to the psychological and emotional development of the child. A recent WHO/UNICEF report states, that breast-fed infants generally show more bodily activity and tend to start walking earlier. Breast-feeding is a natural (though not an absolutely reliable) form of contraception. The more frequent and intense the breast-feeding the greater the contraceptive protection, brought about through increased levels in the maternal blood of the hormone, prolactin, which inhibits ovulation and resumption of menstruation. The WHO/UNICEF report referred to earlier, mentions that breast-feeding alone, in the absence of contraceptives, could increase the interval between childbirths by five to 10 months. In a middle income-group of Indian women, only 62% of those who were breast-feeding their infants had resumed menstruation by eight months after delivery as against 100% of those who were bottle-feeding their infants.

Economic implication

Simple arithmetic will show that with the current levels of income and present cost of baby foods, no working-class family can afford bottle-feeding with baby foods. The same is true of most families in the middle-income-group. Such families when they are persuaded to use baby foods, resort to overdilution in order to stretch the small quantities they can afford to the maximum extent possible. With the shortage of fuel, clean water and storage facilities, they cannot ensure strict hygienic conditions in preparation and feeding. Undernutrition and infection of the infant are the inevitable results. Even for affluent mothers, baby foods may be recommended only if breast-feeding has been attempted and found to have failed. However, some health professionals all too readily assume action failure even when it does not genuinely exist, and instead of reassuring the mothers, advise bottle-feeding with milk formulas. This has given rise to the unfortunate impression of an unholy alliance between some health professionals and baby food manufacturers. Bottle-fed babies of even affluent families do not escape diarrhoeas and dysenteries, partly because *ayahs* and servants are entrusted with the feeding. In recent years, several deleterious effects of baby foods have been reported such as obesity, cow's milk allergy, metabolic stress in premature babies and colitis.

With increasing recognition of the clear superiority of breast milk and greater awareness of possible deleterious effects of baby foods, there are now active movements in developed countries urging return to breast-feeding. As a result, more and more women in those countries are now breast-feeding their infants. Working women even express their breast milk into sterilised cups or bottles so that the baby can have feeds even in the absence of the mother. This, together with the declining birth rates in those countries poses the threat of shrinking markets for baby foods there. The manufacturers are therefore increasingly turning their attention to the poor developing countries of Asia and Africa to expand their markets, much to the detriment of infant nutrition in these countries. The substitution of breast-feeding by bottle-feeding with baby foods at the present stage of our national development, with vast sections of our population still afflicted with poverty, illiteracy and poor sanitation, could prove truly catastrophic. Codes for regulating the marketing and advertisements of baby foods drawn up by international and national agencies will have only very limited value. Commercial firms promoting their different brands of baby food, employ the slogan "breast milk is best" as the opening gambit in their advertisement campaign in order to conform to 'codes' and 'regulations': but, after thus quickly getting over the formal ritual, business generally goes on as usual. Slogans and codes could easily degenerate into a farce, unless backed and supported by practical steps. We may briefly consider some of these steps.

Practical steps

The government, apart from drawing up codes, must enunciate a clear policy on infant nutrition, indicating its determination (a) to promote and foster the breast-feeding practice and to take all appropriate measures for this purpose, (b) to prevent undue expansion of production and import of baby foods and to institute stringent measures to check unethical practices in the marketing and advertisement of these foods. This could be part of a comprehensive national nutrition policy.

In pursuance of such a policy: (1) The government should immediately set up an independent statutory commission vested with sufficient authority and powers to monitor the production, import, marketing, advertisement and sales of all baby foods, and to check undue expansion of production and import of baby foods and unethical promotion, marketing and sales practices likely to erode the practice of breast-feeding. Such a commission could be composed of independent and public sprited paediatricians, eminent social scientists, representatives of voluntary organisations concerned with problems of child health and nutrition, consumer associations and women's organisations.

(2) The media, especially the All India Radio and Doordarshan should stop all advertisements of commercial baby foods and cereal foods. All India Radio programmes reach down to the villages and the villager can hardly distinguish between a commercial advertisement and authentic governmental pronouncement. Instead of propagating such commercial advertisements of baby foods, these agencies should organise frequent programmes for propagating and promoting breast-feeding and for actively dissuading the public from discarding breast-feeding in preference to bottle-feeding of baby foods.

(3) With more women seeking employment outside their homes and with urban migration, the practice of breast-feeding will be put to severe strain in the years ahead. In all our employment programmes involving women, there must be built-in provisions and facilities for preservation and promotion of the breast-feeding practices. Creches must be provided at work-sites and women must be allowed time during working hours to breast-feed their infants. The government may seriously consider increasing maternity leave benefits from the present three months to six months for the first and the second living child (only) in the case of mothers of the weaker sections who continue to exclusively breast-feed their infants for six months.

(4) In undergraduate medical education, in the training of all categories of health personnel and, most importantly, in the training of paediatri-

cians and obstetricians, much greater emphasis than at present, must be laid on the overriding need to preserve and protect the breast-feeding practices. In the ultimate analysis, it is the health professionals who have to play the major role in advising and encouraging mothers to breast-feed their infants. Such advice must always be accompanied by practical suggestions for improving the diets of the nursing mothers in order to sustain their health and nutrition. Promotion of maternal nutrition must be an integral part of all programmes for the promotion of breast-feeding. All this requires adequate training of health professionals at the practical level; at present the training in this regard is wholly inadequate.

(5) However we should not depend on government efforts alone. What we need is a people's movement, in which vigilant voluntary organisations, enlightened citizens, educated women and the press must join hands. It is only when public opinion is thus created and people are alerted, that governmental measures can succeed.

(6) Those who extol the value of breast milk rarely speak of the poor status and low dignity now being accorded to women in our society. Women will normally wish to breast-feed their infants for as long as feasible, because of the emotional satisfaction they would derive therefrom; but they should not be faced with the agonising choice of either pursuing the interests and vocations or of breast-feeding their infants. We need to evolve a policy which will enable them to do both. The development of such a policy is the real challenge to all those interested in national development, women's uplift and child nutrition.